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CHARACTERIZATION AND EVALUATION OF WASTEWATER SOURCES

UNITED STATES STEEL CORPORATION, EDGAR THOMSON PLANT, PITTSBURGH, PENNSYLVANIA, JULY 22 - AUGUST 5, 1975

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The United States Steel Corporation (USSC) Edgar Thomson (ET) Plant is a basic steel production facility* producing steel ingots which in turn are rolled into slabs. The majority of these slabs are conveyed by rail to the Irvin Plant where they are converted into various finished steel and tin products. The ET Plant consists of a sintering plant**, five blast furnaces (BF), two basic oxygen furnaces, a 44-inch slab mill and an ingot mold foundry. Two intake stations on the Monongahela River supply the facility with up to 795,00 m^3/day (210 mgd) of water with only a small portion of this water being treated. The plant discharges wastewater from five outfalls (001, 002, 003, 004, and 010)***which, with the exception of 001, discharge into the Monongahela River (Figure 1). Outfall 001 discharges to Turtle Creek, a tributary of the Monongahela River. In-plant monitoring was conducted during the period July 22 to August 5, 1975. This report discusses the findings of the survey and compares the loads discharged during the above period with the waste load limitations proposed by the USSC in their amended adjudicatory hearing request of March 3, 1975.

*According to company officials the plant was constructed about 100 years ago.
**The sintering plant has not operated since January 1975, because of fugitive dust and other air pollution problems.
***Outfalls 005 through 009 apply to the Irvin Plant.

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UNITED STATES STEEL CORPORATION

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July 22-August 5, 1975

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I. INTRODUCTION

The United States Steel Corporation (USSC) Edgar Thomson (ET) Plant is a basic steel production facility* producing steel ingots which in turn are rolled into slabs. The majority of these slabs are conveyed by rail to the Irvin Plant where they are converted into various finished steel and tin products.

The ET Plant consists of a sintering plant**, five blast furnaces (BF), two basic oxygen furnaces, a 44-inch slab mill and an ingot mold foundry. The plant was recently modernized with the installation of a two-unit Basic Oxygen Plant (BOP). These units replaced the 16 furnace open-hearth shop. The open-hearth furnaces are being razed.

Two intake stations on the Monongahela River supply the facility with up to 795,000 m^3/day (210 mgd) of water with only a small portion of this water being treated. The plant discharges wastewater from five outfalls (001, 002, 003, 004 and 010)***which, with the exception of 001, discharge into the Monongahela River [Figure 1]. Outfall 001 discharges to Turtle Creek, a tributary of the Monongahela River.

In-plant monitoring was conducted during the period July 22 to August 5, 1975. This report discusses the findings of the survey and compares the loads discharged during the above period with the waste load limitations proposed by the USSC in their amended adjudicatory hearing request of March 3, 1975. Production figures for the survey period are tabulated below:

m. Ton (Ton) of Product[1]

Plant Area	7/29	7/30	7/31	8/1	8/2	8/3	8/4	8/5
Blast Furnace	4262 (4699)	4934 (5440)	5197 (5730)	5320 (5865)	5223 (5758)	4971 (5492)	5178 (5709)	4447 (4903)
Basic Oxygen Process	4310 (4752)	4663 (5141)	6829 (7529)	5990 (6604)	7116 (7846)	6578 (7253)	6033 (6651)	6183 (6817)
Slab Mill	3111 (3430)	3537 (3900)	6625 (7304)	4512 (4975)	6037 (6656)	4651 (5128)	5046 (5563)	6183 (6817)
Ingot Mold	729 (804)	726 (800)	684 (754)	661 (729)	435 (480)	444 (490)	689 (760)	696 (767)

*According to company officials the plant was constructed about 100 years ago.
**The sintering plant has not operated since January 1975, because of fugitive dust and other air pollution problems.
***Outfalls 005 through 009 apply to the Irvin Plant.

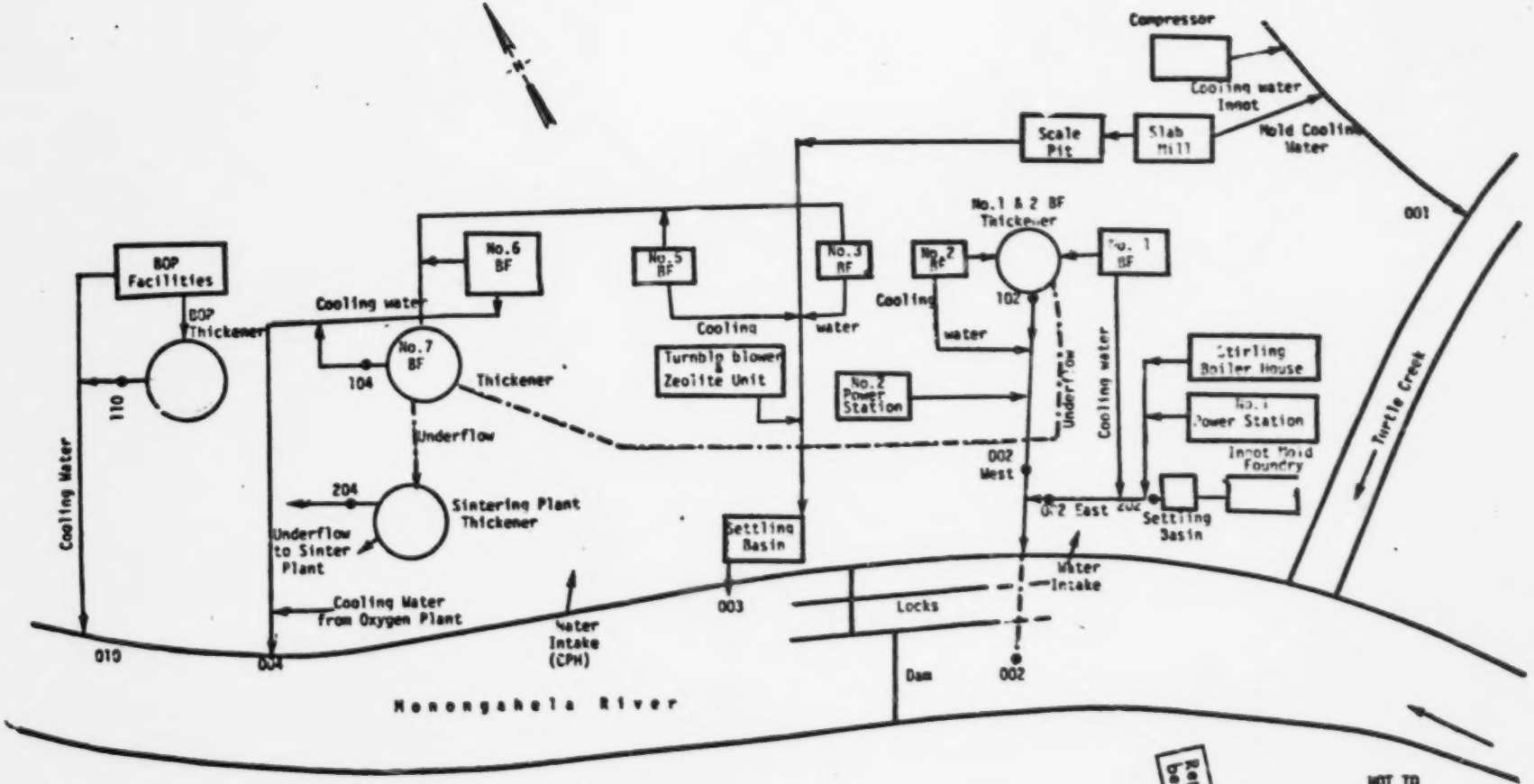

Figure 1. Flow Schematic - Edgar Thomson Plant†

† Table 1 lists station descriptions

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II. SUMMARY

1. Discharge 001 contains ingot mold cooling water, a source of wastewater not previously reported to EPA. Daily maximum oil and grease concentrations ranged from 18 to 51 mg/l. Flow measurement was not possible on this outfall because of surcharged conditions (i.e., river water surface was higher than bottom of the outfall causing water to back up in the line).

2. Wastewaters originating in two areas of the plant are discharged into the Monongahela River through 002, a submerged outfall. The NPDES permit requires monitoring of the entire wastewater discharge. The company, however, is only monitoring a portion (designated by NEIC as 002W) of the discharge which contains the effluent from the No. 1 and 2 BF thickener and cooling water from No. 2 BF and power station No. 2. The remaining part of the discharge (002E) contains ingot mold foundry settling basin effluent, cooling water from No. 1 BF and effluents from the Stirling boiler house and No. 1 power station. The wastewater from the No. 1 power station had not previously been identified to EPA.

Two intermediate discharge points designated as Outfalls 102 and 202 were monitored. Outfall 102 contains the No. 1 and 2 BF thickener effluent. Outfall 202 is the ingot mold foundry settling basin effluent.

The USSC has proposed effluent limitations for Outfalls 102 and 202. The waste loads found during the survey and those proposed are compared below:

	USSC Proposed Limitations		Survey Data	
	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)
Outfall 102 (net discharge)				
TSS	2578 (5678)	7743 (17,034)	433 (955)	1230 (2720)
Total CN	238 (524)	714 (1572)	88 (195)	144 (317)
Ammonia	1082 (2383)	3246 (7149)	808 (1783)	1160 (2550)
Phenol	82 (181)	246.6 (543)	24 (52)	46 (101)
Outfall 202 (gross)				
TSS	3393 (7465)	10,179 (22,395)	248 (548)	310 (675)

Waste loads through these outfalls were generally much less than those proposed by USSC and in no case were the proposed limits exceeded. The flow through Outfall 102 varied from 27,900 m^3/day (7.4 mgd) to 53,600 m^3/day (14.1 mgd)--average of about 38,200 m^3/day (10.1 mgd). The company estimates this flow to be 20,000 m^3/day (5.4 mgd). Flows through Outfall 202 (two days) averaged 1100 m^3/day (0.28 mgd) which is about 60% of the company estimate of 1890 m^3/day (0.5 mgd).

The discharge from Outfall 002W which the Company monitors as 002 ranged from 579,000 m^3/day (153 mgd) to 738,000 m^3/day (195 mgd); an average of 649,000 m^3/day (172 mgd). The company reported this flow to be 341,000 m^3/day (90 mgd). However, the total flow through 002 also includes flows from Outfall 002E which during two days of monitoring averaged 134,500 m^3/day (35.5 mgd). Thus the average flow through 002 (002W + 002E) is about 784,000 m^3/day (207 mgd) more than twice the company's estimate.

No effluent limitations have been proposed by USSC for the 002 discharge. The company plans only to estimate the flow and measure the temperature.

3. Outfall 003 contains the effluent from one slab mill scale pit, cooling water from the No. 3 and 5 blast furnaces and cooling water from the turbo blower station and zeolite backwash. Flows through this outfall ranged from 182,000 to 284,000 m^3/day (48-75 mgd) compared to company estimated flows of 124,900 to 166,500 m^3/day (33-44 mgd). Large quantities of oils and greases are used in the slab mill. This is reflected in the high oil and grease concentrations (17 to 65 mg/l) found in the effluent. The USSC has proposed limitations for total suspended solids and oil and grease. These are tabulated below along with the survey findings for comparison:

	USSC Proposed Limitations		Survey Data	
	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)
TSS	44,448 (97,874)	133,464 (293,620)	14,700 (32,300)	20,000 (44,000)
Oil and Grease	2614 (5750)	7842 (17,250)	8800 (19,400)	10,300 (22,700)

On six of the seven monitoring days, the USSC proposed daily maximum waste load limitations for oil and grease were exceeded. The daily average load limitation for the seven day monitoring period exceeded the USSC proposed daily limitations by 300 percent.

USSC plans to construct new wastewater treatment facilities consisting of additional sedimentation, partial filtration, cooling and 90% recycle. No completion dates were provided by USSC.

4. Outfall 004 contains: a) the effluent from the No. 7 BF thickener which receives underflow from the No. 1 and 2 BF thickener and wastewater from the No. 3, No. 5, and No. 6 blast furnaces; b) the sintering plant thickener which also receives the underflow from the No. 7 BF thickener; and c) cooling waters from the No. 6 BF and oxygen plant. The No. 6 BF was not operating during the survey and about midway through the monitoring No. 5 BF was banked.

Two intermediate points designated as Outfalls 104 and 204 were monitored. Outfall 104 contains the discharge from the No. 7 BF thickener. Overflow from the sintering plant thickener discharges through 204. The USSC has proposed effluent limitations for both these outfalls. These limitations are compared below with the survey findings.

	USSC Proposed Limitations		Survey Data	
	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)
Outfall 104 (Net)				
TSS	4096 (9021)	12,288 (27,063)	20.4 (45)	75 (166)
Total CN	70.4 (155)	211.2 (465)	104 (229)	442 (977)
Ammonia	559 (1232)	1677 (3696)	92.4 (204)	287 (632)
Phenol	43.1 (95)	129.3 (288)	4.6 (10.1)	7.7 (16.9)
Outfall 204 (Net)				
TSS	180 (396)	540 (1188)	270 (595)	557 (1230)
Total CN	3.3 (7.3)	10 (21.9)	58 (128)	180 (398)
Ammonia	48.6 (107)	146 (321)	124 (273)	257 (566)
Phenol	2.3 (5.1)	6.9 (15.3)	2.2 (4.8)	4.5 (9.9)

During the survey, the total suspended solids load through Outfall 104 was many times less than the proposed waste load limit. The total CN, however, exceeded the USSC proposed daily maximum load limitation.

The sintering plant has not operated since January 1975, thus the sintering plant thickener receives only the underflow from the No. 7 BF thickener. The sludge from the former is normally sent to the sintering plant, but during the survey was reported to be landfilled. The sintering plant thickener effluent (Outfall 204) contained total suspended solids, ammonia and total CN loads exceeding the USSC proposed daily average and daily maximum limitations.

The company's estimate of flow through Outfall 104 is 22,700 m^3/day (6 mgd). During the survey, flows ranged from 1500 to 12,300 m^3/day (0.38-3.3 mgd). These lower flows were due to the No. 6 BF not operating and the banking of No. 5 BF about midway through the survey.

The flow from the sintering plant thickener (204) ranged from 4300 to 5300 m^3/day (1.1-1.4 mgd) with an average of 4800 m^3/day (1.26 mgd). This latter figure corresponds closely to the company's estimate of 4700 m^3/day (1.24 mgd).

The USSC has not proposed numerical effluent limitations for Outfall 004, but have proposed only to measure the flow and monitor the temperature.

5. Outfall 010 contains the effluent from the Basic Oxygen Process (BOP) thickener, the blowdown from two cooling towers and minor wastewater flows from the BOP area. An intermediate point designated as 110 (BOP thickener discharge) was monitored during the survey. The USSC has proposed effluent limitations for total suspended solids through this outfall. These are tabulated below with the survey findings.

	USSC Proposed Limitations		Survey Data	
	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)
TSS	585 (1287)	1755 (3861)	313 (690)	492 (1090)

Flows through Outfall 110 ranged from 12,000 to 14,000 m^3/day (3.2-3.7 mgd). The average daily flow during the survey was 13,000 m^3/day (3.4 mgd) which is essentially the same as the company's estimated flow of 13,200 m^3/day (3.5 mgd).

The USSC has proposed measuring the flow from 010 and monitoring the temperature without any numerical limits. At present, they estimate this flow at 37,800 m^3/day (10 mgd). Actual flows during the survey were somewhat lower, ranging from 20,700-30,200 m^3/day (5.5-8.0 mgd) with a daily average flow of 23,800 m^3/day (6.3 mgd).

6. During the NEIC survey, flow measurements were made at all stations except 001 and 202 using the dye dilution technique. Flow measurement and representative sampling was not possible on Outfall 001 because of the surcharged condition. Instantaneous flow measurements using a Marsh McBirney

portable flow meter were made on Outfall 202 each time a sample was collected.

As discussed earlier, flows through Outfalls 102, 002 (002W and 002E) and 003 were greater, in one case by more than a 100%, then those estimated by the Company. The flows through Outfalls 110 and 204 were essentially the same as reported by the company. Lower flows than those estimated by the company were measured from Outfalls 104 and 010.

7. Flows should be continuously measured and recorded on Outfalls 102, 202, 003, 104, 204 and 110. Flows should be continuously measured and recorded two days each month on Outfalls 002 (002E + 002W), 004 and 010. All composite samples should be flow weighted.

Outfalls 001, 003, 004 and 010 are subject to surcharging at high river stage. Therefore representative samples cannot be collected. Modifications to the present configurations of these outfalls are necessary to allow accurate flow measurement and representative sample collection.

III. MONITORING PROCEDURES

During June 23-25, 1975, a reconnaissance visit was conducted at the Edgar Thomson Plant in order to observe process operations, waste treatment systems and sampling locations. A report describing this visit is located in Appendix F. The amount of intake water and wastewater discharged is not measured but estimated by the company. Estimates are based on an intake capacity of 210 mgd. The water use in various processing areas of the plant are, according to company officials, estimated by the accounting department. The wastewater flows are, in turn, estimated from the water use estimates. However, definitive information on the water-wastewater accounting procedures was not provided by USSC. The company recently retained a consultant firm, Chester Engineers, to determine actual flows. This information has not been provided to EPA.

In-plant monitoring was conducted at selected stations [Table 1 and Figure 1]. The parameters monitored, sample type and the number of days each station was sampled are shown in Table 2. Details on the a) sampling procedures and flow measurement techniques; b) analytical procedures and quality control; and c) chain of custody procedures are contained in Appendices A, B, and C respectively.

Waste loads discharged from each station are determined on either a net or gross basis [Table 1]. The company monitors the intake water at the Central Pump House located immediately downstream from Outfall 003 [Figure 1]. The water intake* located upstream of Outfall 002 is not monitored by the company. To determine the net loads, the intake concentration is subtracted from the waste discharge concentration and the result multiplied by the flow which is estimated as described earlier.

In conducting self-monitoring, the company personnel collects time-weighted 24-hour composite samples comprised of six aliquots taken at equally spaced intervals during the compositing period. Grab samples for oil and grease analysis are collected once per eight hours.

During monitoring by NEIC, the effluent flows, except at Outfalls 001 and 002, were obtained using the dye dilution technique [Appendix A]. Flow measurement at Outfall 001 was not possible because of surcharged conditions. Instantaneous flow measures were made at Outfall 202 (ingot mold foundry settling basin effluent), using a Marsh McBirney portable flow meter.

Samples were collected for specific organic chemical pollutants from selected stations [Table 2]. No measureable levels were identified by the combined gas chromatography/mass spectrometry (GC/MS) method used.

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*This intake provides cooling water for power station No. 1.

TABLE 1
Description of Monitoring Stations
at the
USSC Edgar Thomson Plant

Map Key*	Description	USSC Proposed Limitations Net/Gross
001	Cooling water discharge into Turtle Creek	Gross
002W	Discharge from No. 1 and 2 BF thickener and BF cooling water	Gross
102	Discharge from No. 1 and 2 BF thickener	Net
002E	Discharge from ingot mold foundry and BF cooling water	Gross
202	Discharge from settling basin at ingot mold foundry	Gross
003	Discharge from slab mill settling basin	Gross
004	Discharge from No. 7 BF and sintering plant thickeners and BF cooling water	Gross
104	Discharge from No. 7 BF thickener	Net
204	Discharge from sintering plant thickener	Net
010	Discharge from BOP thickener and cooling water	Gross
110	Discharge from BOP thickener	Gross
CPH	Central pump house water intake	--

*Figure 1 shows outfall location

TABLE 2

SAMPLING SCHEDULE FOR USSC EDGAR THOMSON PLANT

Station Description	Number Days Sampled	Type of Sample	Parameter[1]
Cooling water discharge from tar pumps (001) into Turtle Creek	3	Grab	O&G; phenol; TSS; dissolved and total iron.
Discharge from No. 1 & 2 BF thickener and BF cooling water (002W)	7	24 Hr. Comp. Grab	TSS; total and amenable cyanide; ammonia; total and dissolved iron and zinc, copper. phenol[2]; organics[3].
Discharge from ingot mold foundry and BF cooling water (002E)	2	24 Hr. Comp.	TSS.
Discharge from settling basin ingot mold foundry (202)	2	24 Hr. Comp. Grab	TSS. Organics[3].
Discharge from No. 1 & 2 BF thickener (102)	7	24 Hr. Comp. Grab	TSS; total and amenable cyanide; ammonia; total and dissolved iron and zinc; copper. Phenol[3]
Discharge from settling basin (003)(filter backwash, hot forming slab scale pit BF cooling water) and possible storm sewer water	7	24 Hr. Comp. Grab	TSS, O&G[2]; organics[3].

TABLE 2 (cont.)

SAMPLING SCHEDULE FOR USSC EDGAR THOMSON PLANT

Station Description	Number Days Sampled	Type of Sample	Parameter[1]
Discharge from No. 7 BF and Sinter Plant thickeners, BF cooling water & possible storm sewer water (004)	7	24 Hr. Comp.	TSS; total and amenable cyanide; ammonia; total and dissolved iron and zinc; copper
		Grab	Phenol[2]; organics[3].
Discharge from No. 7 BF thickener (104)	7	24 Hr. Comp.	TSS; total and amenable cyanide; ammonia; total and dissolved iron and zinc; copper.
		Grab	Phenol[2].
Discharge from Sintering Plant thickener (204)	7	24 Hr. Comp.	TSS; total and amenable cyanide; ammonia; total and dissolved iron[4] and zinc[4]; copper[4].
		Grab	Phenol[2], O&G[2].
Discharge from BOP thickener and cooling tower blowdown (010)	7	24 Hr. Comp.	TSS; total and dissolved iron and zinc; total and hexavalent chromium; copper.
		Grab	Organics[3].
Discharge from BOP thickener (110)	7	24 Hr. Comp.	TSS; total and dissolved iron and zinc; copper.
Central pump house intake	7	24 Hr. Comp.	TSS: total and amenable cyanide; ammonia; total and dissolved iron and zinc; total and hexavalent chromium; copper.
		Grab	O&G[2]; phenol[2]; organics[3].

1/ pH and Temperature were measured periodically at all stations.
2/ O&G and Phenol samples were collected 3 times each day.
3/ Organics were sampled twice during survey.
4/ Analyzed one day only for this parameter.

IV. FINDINGS OF IN-PLANT MONITORING

OUTFALL 001

Outfall 001, according to company officials, contains non-contact cooling water from an air compressor located in the tar transfer area [Figure 1]. This compressor is seldom used because the open-hearth furnaces were shutdown. When operating, company personnel estimated that 378.5 m^3/day (0.1 mgd) of cooling water enters Turtle Creek through Outfall 001. An oil boom was present in Turtle Creek at the point of discharge. Company officials indicated that accumulated oil was not removed. At the time of the reconnaissance, the oil boom was not operating effectively and oil was entering the stream. Following the reconnaissance and prior to the in-plant monitoring, the company installed a floating pump to remove the oil. The surface oil was pumped into a filter box filled with an absorbent. The discharge from the box entered Turtle Creek.

During NEIC monitoring, Outfall 001 which discharges intermittently was checked routinely for flow. When positive flow occurred, grab samples were collected for selected parameters [Table 2]. However, because of the surcharged conditions (i.e., river water surface was higher than the bottom of the outfall causing water to back up in the line), these samples cannot be considered representative. The analytical results [Tables 3, 4 and 5] of this grab sampling showed concentrations of 23-140 mg/l total suspended solids; 2.7-6.6 mg/l iron; 18-51 mg/l oil and grease; and 2-4 µg/l phenol. No waste loads could be calculated because flow measurement was not possible. The self-monitoring data for this outfall [Table 6] shows that the phenol concentrations were many times greater than found during the NEIC survey and ranged from 0.12-1.3 mg/l (120-1300 µg/l). Oil and grease concentrations reported have ranged from 0-900 (average of 126) mg/l. The USSC has proposed a daily maximum oil and grease load limitation of 32.7 kg (72 lb) for 001. The company estimates the flow through this outfall at 378.5 m^3/day (0.1 mgd). At the proposed waste load limitation, this would allow an oil and grease concentration of 86 mg/l.

On August 2, 1975, a brownish colored effluent containing oil was observed. Company officials stated that this wastewater resulted from the cooling of ingot molds in the slab mill, a source of wastewater not previously reported to EPA.

OUTFALL 002

The 002 waste sewer receives wastes from two separate lines [Figure 1]. These wastewaters combine and discharge through a submerged outfall into the Monongahela River. There is no point of access to Outfall 002 downstream from the point where the two separate sewers combine. During the survey, NEIC designated the two waste sewers as 002 East (002E) and 002 West (002W). For self-monitoring purposes, USSC samples the latter sewer and reports the data for Outfall 002. The 002E sewer which contains wastewater from the ingot mold foundry settling basin (202), cooling water from the blast

furnace No. 1, and effluents from the Stirling boiler house and No. 1 power station* is not sampled.

Wastewater from four multi-wash dust collectors (2040 m^3/min.--72,000 cfm capacity) in the ingot mold foundry is discharged into two parallel settling basins at a rate of 132,500 m^3/min. (350 gpm). Each basin is 9 m (31 feet) long by 4 m (13 feet) wide by 3.1 m (10.2 feet) deep.

Composite samples were collected for two days from 002E and 202 for total suspended solids analysis. Results [Table 3] show that 002E contained from 1650 to 5280 kg/day (3630 to 11,700 lb/day) of total suspended solids (TSS). Approximately 20% of these solids originated from the ingot mold settling basin discharge (202).

The wastewater flow (002E) averaged 134,500 m^3/day (35.5 mgd) which is more than four times that estimated by the company; i.e., 30,300 m^3/day (8 mgd)**. The effluent flow from the settling basin averaged 1100 m^3/day (0.28 mgd) or approximately 50% of the company's estimates of 1890 m^3/day (0.5 mgd)***.

Self-monitoring data [Table 6] show that the total suspended solids concentration for Outfall 202 varies from 23 to 2850 (846 average) mg/l. USSC has proposed total suspended solids limits for this discharge as follows:

	kg/day	lb/day
Daily Average	3,393	7,465
Daily Maximum	10,179	22,395

At the flow rate of 1100 m^3/day, observed during the survey, the daily concentration would have to exceed 11,700 mg/l before a violation of the USSC proposed daily maximum criteria would occur.

Outfall 002W contains the No. 1 and 2 BF thickener effluent (102), No. 2 BF cooling water and No. 2 power station cooling water. The No. 1 and 2 BF thickener, which receives wastewater from No. 1 and 2 blast furnaces, has two levels and is 27 m (90 feet) in diameter by 5 m (16 feet) high with a conical bottom of 2 m (6 feet) deep. The effluent is discharged to Outfall 002 with the sludge (underflow) receiving additional treatment in the No. 7 BF thickener (104).

Composite sampling was performed for seven consecutive days on Outfalls 002W and 102 [Table 2]. Grab samples were collected three times daily for phenol analysis. Flows ranged from 579,000 m^3/day (153 mgd) to 738,000 m^3/day (195 mgd) for Outfall 002W****, and from 27,900 m^3/day (7.4 mgd) to 53,600 m^3/day

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*The No. 2 power station effluent had not previously been identified to EPA.
**Based on data submitted in permit application.
***From self-monitoring reports submitted to EPA for the period January 1 to March 31, 1975.
****The variation in daily flows are probably due to varying demand for cooling water in the No. 2 power station.

(14.1 mgd) for this date compared with daily flows of 27,900 m^3--39,600 m^3 (7.4-10.5 mgd) for the other six monitoring days. The sample for August 2, 1975, was composited based on this erroneous flow and the results reported reflect this discrepancy [Table 3].

On July 26, 1975, large globules of oil were observed in Outfall 002W. Samples were collected from 002W and the Monongahela River for oil and grease analysis [Appendix C].

Monitoring results [Tables 3 and 5] show that the No. 1 and 2 BF thickener effluent (102) contained maximum net loads of 1230 kg/day (2720 lb/day) total suspended solids; 1160 kg/day (2550 lb/day) ammonia; 144 kg/day (317 lb/day) total CN; and 45.6 kg/day (101 lb/day) phenol. Self-monitoring data [Table 6] for the period February 24 to May 19, 1975, show that the concentrations of parameters measured by USSC are similar in magnitude to those obtained during the survey.

USSC plans to install a BF recycle wastewater treatment system[2]. Effluent from the new facility will discharge through Outfall 004 eliminating the present No. 1 and 2 BF thickener discharge through Outfall 002. Until this new facility is in operation, USSC proposes the following net limitations for Outfall 102:

Parameter (Net Basis)	Daily Average kg/day(lb/day)	Daily Maximum kg/day(lb/day)
TSS	2578(5678)	7743(17,034)
Ammonia (N)	1082(2383)	3246(7149)
Total CN	238(524)	714(1572)
Phenol	82.2(181)	246.6(543)

During the survey, the calculated waste loads were well below the above proposed waste load limitations [Table 7]. For example, the average and maximum total suspended solids loadings were 434 kg/day (956 lb/day) and 1230 kg/day (2720 lb/day) respectively, about 17% of the proposed limitations.

The company proposes only to estimate the flow and monitor Outfall 002W for temperature with no numerical limits for the duration of the permit. Survey results show that the net increase in pollutants for this discharge results from the No. 1 and 2 BF thickener (i.e., Outfall 102). To determine the total waste load discharged from Outfall 002 to the Monongahela River it will also be necessary for USSC to monitor 002E.

OUTFALL 003

This outfall contains the effluent from slab mill scale pits; cooling water from BF Nos. 3 and 5; cooling water from the turbo blower station and zeolite backwash [Figure 1]. The entire flow estimated by company officials

as 166,500 m^3/day (44 mgd) passes through a settling basin* prior to being discharged into the Monongahela River through a submerged outfall. The settling basin is equipped with an oil boom and a floating skimmer (drum type) upstream of the weir. Large quantities of floating oils were present in the basin along with oily accumulations on the sidewalls of the basin. The company does not maintain records on the amount of oil removed or the efficiency of the skimmer.

The water depth in the settling basin varies directly with the stage of the Monongahela River. As a result, at high stages, the weir becomes submerged. Although this condition did not occur during the survey, wastewater samples collected during submerged periods would not be representative.

The slab mill is the major user of oils and greases. According to company data for January 1 to June 30, 1975, average monthly usage was:

	Sunoco Black Lithium Grease	Sunoco Durasun 140	Mobil DTE Heavy Medium
Slab Mill	37,870 kg (83,600 lb)	14,500 kg (32,000 lb)	Not identified
Other Areas of the Plant	680 kg (1500 lb)	Not Used	4390 liters (1160 gallon)

Company officials do not know the amount of these oils and greases that are discharged into the river[1].

Composite samples were collected for seven days and analyzed for total suspended solids. Grab samples for oil and grease analysis were collected three times each day [Table 2]. During the survey, 182,000 to 284,000 m^3/day (48-75 mgd) of wastewater were discharged from this outfall. Results [Table 3] show that the effluent contained total suspended solids loads ranging from 11,900 to 20,000 kg/day (26,200 to 44,000 lb/day). The oil and grease concentration [Table 4] ranged from 17 to 65 mg/l, yielding calculated loads of 6210 to 10,280 kg/day (13,700 to 22,700 lb/day).

Self-monitoring data [Table 6] for the period January 22 to June 16, 1975, were similar for total suspended solids, but considerably less for oil and grease. Company data show that the oil and grease concentrations ranged from 0.07 to 25.6 mg/l while the survey concentrations ranged from 17 to 65 mg/l. The company estimated average flows of 124,900 to 166,500 m^3/day (33 to 44 mgd)**were less than values recorded during the survey (e.g., the minimum flow was 182,000 m^3/day).

*The basin is 59 m (193 feet) in length and has tapered side walls giving a width of 10 m (34 feet) at the top and 8 m (25 feet) at the bottom. The maximum water depth is 3 m (11 feet).
**From self-monitoring reports submitted to EPA for the period January 1 to March 31, 1975.

USSC has proposed the following gross limitations for the duration of the permit with the flow to be estimated:

Parameter	Daily Average kg/day	(lb/day)	Daily Maximum kg/day	(lb/day)
TSS	44,488	(97,874)	133,464	(293,620)
Oil & Grease	2,614	(5,750)	7,842	(17,250)

A comparison of survey data to these proposed limitations [Table 7] show that the daily maximum oil and grease limitation was exceeded six out of seven days. The oil and grease average limitation was exceeded by 300 percent.

USSC plans to construct a recycle wastewater treatment facility[2]. These facilities will include additional sedimentation, partial filtration, cooling and 90% recycle. A construction schedule has not been provided.

OUTFALL 004

Outfall 004 contains the effluents from the No. 7 BF thickener (104), the sintering plant thickener (204), cooling waters from No. 6 BF and the oxygen plant.

The No. 7 BF thickener (104) receives sludge (underflow) from the No. 1 and 2 BF thickener and wastewater from BF No. 3, No. 5 and No. 6. The thickener is 29 m (95 feet) in diameter by 3 m (10 feet) deep with a conical bottom 2 m (6 feet) deep[1]. The company estimates the thickener effluent to be 22,700 m^3/day (6 mgd)*. The No. 6 BF was not operating during the survey, thus the flows from 104 were about 40% of the USSC estimate the first part of the monitoring period. However, about midway through the monitoring, the No. 5 BF was banked. As a result, the flows dropped by 80% of that measured at the beginning [Table 3].

As indicated earlier, USSC plans to construct additional BF treatment facilities with the effluent being recycled. Until these new treatment facilities are constructed, USSC proposes the following net limitations on the No. 7 BF thickener discharge (i.e., Outfall 104) with the flow to be measured.

Parameter	Daily Average kg/day	(lb/day)	Daily Maximum kg/day	(lb/day)
TSS	4096	(9021)	12,288	(27,063)
Ammonia (N)	559	(1232)	1677	(3696)
Total CN	70.4	(155)	211.2	(465)
Phenol	43.1	(95)	129.3	(288)

*From self-monitoring reports for the period January 1 to March 31, 1975.

Composite samples were collected for seven days and analyzed for total suspended solids; total and amenable cyanide; ammonia; total and dissolved iron and zinc and copper. Grab samples for phenol analysis were collected three times each day [Table 1].

During the survey, only the total cyanide proposed limitations were exceeded [Table 3]. The proposed maximum load limitation, for example, was exceeded by more than 200 percent.

Self-monitoring [Table 6] for the period January 16 to May 19 show that the total suspended solids, NH_3 and phenol concentrations were similar to those obtained during the survey [Tables 3 and 4]. Reported total and amenable cyanide concentrations averaged 6.22 and 4.58 mg/l respectively which are significantly lower than the average values of 21.1 mg/l total CN and 19.3 mg/l amenable CN obtained during the survey.

The sintering plant has not operated since the first of the year because of fugitive dust and other air pollution problems. Therefore, the sintering plant thickener (204) was receiving only the underflow (sludge) from the No. 7 BF thickener. The final sludge is dewatered in disc filters and is normally used in the sintering plant. During the survey, the sludge was reported as being landfilled.

The sintering plant thickener has two levels and is 15 m (50 feet) in diameter by 5 m (17 feet) deep. It treats an estimated 4700 m^3/day (1.24 mgd) of wastewater[1]. Survey flows ranged from 4300 m^3/day (1.1 mgd) to 5300 m^3/day (1.4 mgd). This discharge will also receive additional treatment in the proposed new recycle BF wastewater treatment facility. Until the completion of this system, USSC has proposed the following net effluent limitations for Outfall 204.

Parameter	Daily Average kg/day	(lb/day)	Daily Maximum kg/day	(lb/day)
TSS	180	(396)	540	(1188)
Ammonia (N)	48.6	(107)	146	(321)
Total Cyanide	3.3	(7.3)	10	(21.9)
Phenol	2.3	(5.1)	6.9	(15.3)

The effluent flow is to be measured.

Composite samples were collected for seven days and analyzed for total suspended solids, total and amenable cyanide and ammonia. One composite sample was analyzed for total and dissolved iron and zinc and copper. Grab samples for oil and grease and phenol analyses were collected three times each day. Results [Tables 3 and 4] show that the proposed daily maximum limitations for total suspended solids, ammonia and total cyanide were exceeded on 2, 3 and 6 out of the 7 samples respectively. In addition, the proposed daily average for total suspended solids and ammonia load limitations were exceeded by 150 and 260 percent respectively. The total cyanide load was 17 times greater than the daily limitation.

Oil and grease concentrations [Table 4] ranged from 9 to 100 mg/l with 12 out of 20 samples exceeding 30 mg/l. Although no oil and grease limitation was proposed for this discharge, these concentrations indicate that a limitation for this parameter is necessary.

The company self-monitoring data [Table 6] for the period January 16 to May 19, 1975, are similar to NEIC survey results.

USSC proposes only to measure the flow and temperature of Outfall 004, without any numerical limitations. Company officials estimate this flow at 26,500 m^3/day (7 mgd)*. Survey flows were significantly higher ranging from 40,900 to 60,700 m^3/day (10.8 to 16.0 mgd).

The net pollutant loads in Outfall 004 were approximately equivalent to the sum of the loads discharged from the No. 7 BF thickener (104) and the sintering plant thickener (204) [Table 3].

OUTFALL 010

Outfall 010 contains the effluent from the basic oxygen process (BOP) thickener (110), the blowdown from two cooling towers and minor wastewater flows from the BOP area [Figure 1]. Company officials estimate that 37,800 m^3/day (10 mgd)* of wastewater are discharged to the Monongahela River through Outfall 010. Actual flows varied from 20,700 to 30,200 m^3/day (5.46 to 8.0 mgd), lower than the reported flow.

USSC has also proposed measuring the flow and temperature without numerical limitations for Outfall 010. Composite samples for total suspended solids, total and dissolved iron and zinc, total and hexavalent chromium and copper analyses were collected for seven days [Table 2]. During the survey, total suspended solids and dissolved iron concentrations ranged from 37 to 190 mg/l and 0 to 0.07 mg/l respectively [Tables 3 and 5]. These total suspended solids values are somewhat higher than those reported in the self-monitoring data (i.e., 16 to 69 mg/l).

Company officials indicated that chromium is not used in the cooling towers. The composite samples collected of the discharge substantiate this. The chromium concentrations ranged from <0.01 to 0.04 mg/l [Table 8].

Water used to scrub and cool the BOP exhaust gases passes through a clarifier 7.6 by 0.7 m (25 feet by 2.29 feet)--the solids removed are dewatered and landfilled. A portion of the effluent is recycled to the gas cooling tower with the rest discharged into the BOP thickener (110). The BOP thickener,

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*From self-monitoring reports for the period January 1 to March 31, 1975.

35 m (115 feet) in diameter, has a 2.3 m (7.5 feet) side water depth and an estimated flow rate of 13,200 m^3/day (3.5 mgd)* [Figure 2]. Flows during the survey varied from 12,000 to 14,000 m^3/day (3.2 to 3.7 mgd).

USSC has proposed gross total suspended solids limitations for the duration of the permit of 585 kg/day (1287 lb/day) daily average and 1755 kg/day (3861 lb/day) daily maximum for Outfall 110. Results [Table 3] show that the daily average and daily maximum total suspended solids loads in the thickener effluent were 313 kg/day (690 lb/day) and 492 kg/day (1090 lb/day) respectively which are considerably less than the proposed limitations.

The self-monitoring data [Table 6] for the period January 23 to June 30 show that the gross total suspended solids concentration ranged from 0 to 288 mg/l with an average of 34 mg/l. This data is comparable to the survey data during which the gross total suspended solids concentration averaged 24 mg/l.

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*From self-monitoring reports for the period January 1 to March 31, 1975.

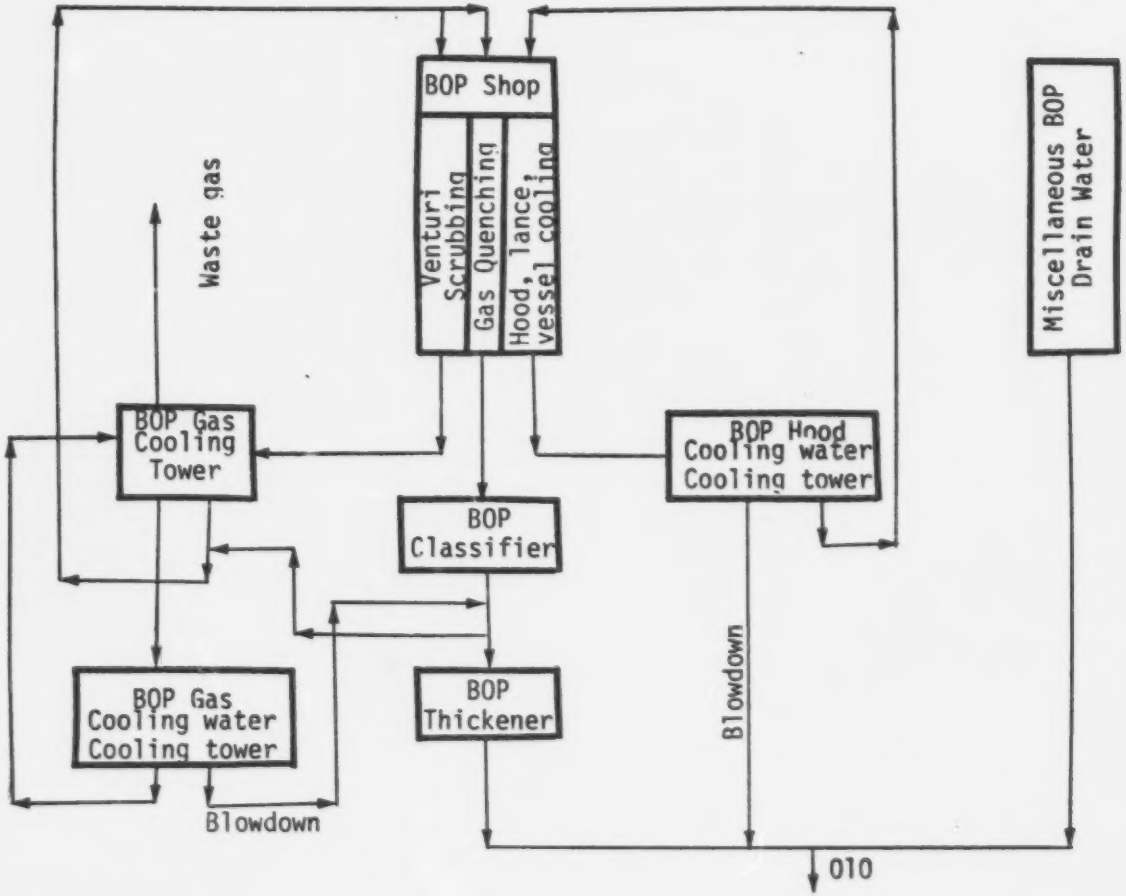

Fig. 2. Flow schematic for BOP Plant[3]

V. MONITORING REQUIREMENTS

As noted earlier, USSC personnel collect time weighted, 24-hour composite samples and estimate flow on all discharges from the Edgar Thomson Plant. Grab samples for oil and grease analysis are collected once per eight hours. Due to the variability of wastewaters, composite samples should be collected on a flow-weighted basis. To accomplish this, flows need to be measured and recorded continuously.

During the survey, the dye dilution technique was the only feasible means of measuring wastewater flows because the discharge points were not amenable to flow measurement using conventional methods such as flumes, flow meters, etc. Moreover, to install the latter flow measurement devices will require modification of the existing outfalls and discharge structures.

The dye dilution technique could be used to measure and record flow on a continuous basis. The method requires an upstream dye injection point and a sampling point downstream, a sufficient distance of all wastewater inputs to allow adequate mixing. The sampled wastewater can be pumped through a fluorometer with the results being recorded continuously. This method of continuous flow measurement is both time consuming and costly. For example, flow measurement at a discharge point would require a metering pump for controlled dye injection, sampling pump, fluorometer and a strip recorder. These items would cost from $2,700 to $3,000*. In addition, a suitable dye such as Rhodamine WT would cost about $2.00/day per 3785 m^3/day (1 mgd). Due to the costs involved with the dye dilution method, conventional flow measurements would seem to be preferable.

Wastewaters (primarily scrubber waters) from the blast furnaces, the BOP plant and the sintering plant are treated in thickeners. Ingot mold foundry and slab mill wastewaters are treated in settling basins. These effluents combined with cooling waters from the blast furnaces, the BOP plant, power plants, etc., and the combined flows are then discharged into the Monongahela River through Outfalls 002 (002E and 002W), 003, 004 and 010.

USSC personnel presently sample the thickener and settling basin effluents (102, 202, 104, 204, 110) and the combined discharges (002, 003, 004 and 010). As mentioned previously, Outfall 002E is not monitored. Outfalls 002, 004 and 010 are currently monitored for pH and temperature which is not adequate. For example, pH and temperature are not sufficient to detect the discharge of untreated process wastewaters in the cooling waters.

The flows from Outfalls 102, 202, 003, 104, 204 and 110 should be continuously measured and recorded. This can be accomplished by: a) modification

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*This does not include maintenance which would be required on the pumps and fluorometer. The UV lamps in the fluorometer, for example, cost about $9.00 and last approximately one week.

of the overflow structures, or b) installation of in-line meters. Outfalls 002*, 004 and 010 should be sampled and the flow continuously measured twice per month. These outfalls should be sampled on the same day that intake water, thickener effluents and settling basin effluents are sampled to determine net waste loads [Table 9].

As noted earlier, USSC plans to construct two new wastewater treatment systems. One will treat the effluents from the blast furnace and sintering plant thickeners (102, 104 and 204). These thickeners will continue to provide pretreatment of wastes. The final effluent will be discharged into Outfall 004 eliminating the present discharge of process wastewater through 002W**. The second new wastewater treatment facility will treat the slab mill wastes discharged through Outfall 003. The settling basin on 003 will probably be used as a polishing basin for this new facility.

As discussed previously, process wastewaters are combined with cooling waters and discharged through a common outfall into the Monongahela River. During the survey, process wastewaters (Outfalls 102, 202, 104, 204 and 110), except for the slab mill (Outfall 003), were sampled prior to mixing with cooling water. Sampling locations do not exist for sampling cooling waters. Therefore, the extent of contamination of cooling water by untreated process wastes cannot be determined. In order for this to be done, access points will need to be provided in Outfalls 002, 003, 004 and 010 such that representative sampling and flow measurement can be accomplished prior to mixing with treated process wastes.

During the survey, samples collected from Outfall 001 were not representative because of surcharged conditions. In addition, flow measurement was not possible. To obtain representative samples and accurate flow measurement will require that access to Outfall 001 be provided at a point where there is no interference due to surcharging and the flow is well mixed.

The settling basin on Outfall 003 is directly influenced by river stage. As the river rises, the water level in the basin rises. Consequently, the outfall weir becomes surcharged. During periods of submergence, representative samples cannot be collected. Similarly under present discharge configurations, Outfalls 004 and 010 are subject to surcharging from the Monongahela River precluding representative sampling and flow measurement at high-river stage. Changes on the present outfall configuration will be necessary to allow accurate flow measurement and the collection of representative samples until the new treatment facilities are operational. After completion, samples and flow measurements should be taken on the treated discharge, which precludes the above problem.

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*Flow from Outfall 002 will require measuring the flow through 002E and 002W.
**After completion of the new BF treatment facility, 002W should contain only cooling waters.

TABLE 3
SUMMARY OF FIELD MEASUREMENTS AND ANALYTICAL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date[2]	Flow m^3/day X 10^{-3}	Flow (mgd)	pH Range	Temp °C Range	Gross[3] / Net	TSS mg/l	TSS kg/day	TSS (lb/day)	Total CN mg/l	Total CN kg/day	Total CN (lb/day)	Amenable CN mg/l	Amenable CN kg/day	Amenable CN (lb/day)	Ammonia (N) mg/l	Ammonia (N) kg/day	Ammonia (N) (lb/day)
Cooling water discharge into Turtle Creek (001)[4]	8/2 (0945)[a]					G	29											
	8/2 (1350)			7.7	39	G	36			0.02			0.02			0.29		
	8/3			8.8	31	G				0.02			0.02			0.52		
	8/4			8.5	37	G	23			<0.02			<0.02			0.55		
	8/5					G	140											
Discharge from No. 1 and 2 BF thickener and BF cooling water (002W)	7/30	651	(172)[5]	7.0-7.8	28-34	G	15	9760	(21,500)	0.11	72	(158)	0.09	59	(129)	1.5	976	(2150)
	7/31	738	(195)	7.2-8.8	32-37	G	18	13,300	(29,300)	0.19	140	(309)	0.17	125	(277)	2.0	1480	(3250)
	8/1	579	(153)	7.4-7.8	34-37	G	15	8680	(18,140)	0.10	58	(128)	0.10	58	(128)	1.8	1040	(2300)
	8/2[6]	609	(161)	7.1-7.6	36-39	G	10	6090	(13,400)	0.48	292	(645)	0.48	292	(645)	2.1	1280	(2820)
	8/3	613	(162)	7.1-7.6	36-38	G	25	15,300	(33,800)	0.33	202	(446)	0.33	202	(446)	2.5	1530	(3380)
	8/4	666	(176)	7.0-7.7	34-37	G	32	21,300	(47,000)	0.20	133	(294)	0.18	120	(264)	2.3	1530	(3400)
	8/5	689	(182)	7.0-7.6	34-36	G	77	53,000	(117,000)	0.10	69	(152)	0.10	69	(152)	2.0	1380	(3040)
Discharge from No. 1 and 2 BF thickener (102)	7/30	36.3	(9.6)	7.0-7.5	41-47	G	42	1530	(3360)	4.0	145	(321)	3.9	141	(313)	17	617	(1360)
	7/31	27.9	(7.4)	7.1-7.6	45-48	G	48	1345	(2960)	3.0	84	(185)	2.9	81	(178)	24	671	(1480)
	8/1	34.4	(9.1)	7.1-7.3	46-49	G	27	926	(2050)	1.5	51	(114)	1.5	51	(114)	20	687	(1520)
	8/2[6]	53.6	(14.1)	6.9-7.3	45-47	G	51	2730	(6020)	2.5	134	(295)	2.3	123	(272)	22	1174	(2600)
	8/3	39.6	(10.5)	6.5-7.0	43-48	G	28	1110	(2440)	2.5	99	(218)	2.5	99	(218)	22	874	(1920)
	8/4	39.6	(10.5)	6.6-7.5	42-48	G	30	1190	(2610)	1.5	59	(131)	1.5	59	(131)	24	951	(2090)
	8/5	36.3	(9.6)	6.5-7.1	44-46	G	50	1820	(4000)	1.5	55	(120)	1.5	55	(120)	24	874	(1920)
	7/30					N	12	435	(960)	3.96	144	(317)	3.86	141	(309)	16.37	596	(1310)
	7/31					N	29	811	(1780)	2.96	83	(183)	2.86	80	(178)	23.30	651	(1440)
	8/1					N	15	516	(1140)	1.48	51	(112)	1.48	51	(112)	19.24	662	(1460)
	8/2					N	23	1230	(2720)	2.45	131	(289)	2.25	120	(266)	21.67	1160	(2550)
	8/3					N	1	39	(87)	2.47	98	(215)	2.47	98	(215)	21.18	838	(1850)
	8/4					N	0	0	0	1.47	58	(129)	1.47	58	(129)	23.06	908	(2010)
	8/5					N	0	0	0	1.48	54	(118)	1.48	54	(118)	23.18	842	(1860)

[a]Time sample collected

TABLE 3 (cont.)
SUMMARY OF FIELD MEASUREMENTS AND ANALYTICAL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date[2]	Flow m^3/day X 10^3	Flow (mgd)	pH Range	Temp °C Range	Grab[3] / Net	TSS mg/l	TSS kg/day	TSS (lb/day)	Total CN mg/l	Total CN kg/day	Total CN (lb/day)	Amenable CN mg/l	Amenable CN kg/day	Amenable CN (lb/day)	Ammonia (N) mg/l	Ammonia (N) kg/day	Ammonia (N) (lb/day)
Discharge from ingot mold foundry and BF cooling water (002E)	8/1	127	(33)	8.6-9.6	36-40	G	13	1650	(3630)									
	8/2	142	(38)	8.3-9.2	37-43	G	37	5280	(11,700)									
Discharge from settling basin at ingot mold foundry (202)	8/1	1.1	(0.29)	7.5-8.0	24-27	G	280	310	(675)									
	8/2	1.06	(0.28)	6.8-7.7	24-27	G	180	190	(420)									
	8/1					N	268	295	(645)									
	8/2					N	152	160	(355)									
Discharge from settling basin (003)	7/30	227	(60)	7.4-8.7	32-38	G	58	13,200	(29,000)									
	7/31	219	(58)	7.3-8.8	32-35	G	55	12,070	(26,600)									
	8/1	284	(75)	8.1-9.4	34-38	G	60	17,000	(37,500)									
	8/2	227	(60)	7.5-9.3	32-38	G	64	14,500	(32,000)									
	8/3	227	(60)	7.6-9.3	31-34	G	61	13,800	(30,500)									
	8/4	242	(64)	7.6-9.4	30-35	G	49	11,900	(26,200)									
	8/5	182	(48)	7.3-9.9	31-34	G	110	20,000	(44,000)									
	7/30					N	28	6360	(14,000)									
	7/31					N	36	7900	(17,400)									
	8/1					N	48	1360	(30,000)									
	8/2					N	36	8170	(18,000)									
	8/3					N	34	7720	(17,000)									
	8/4					N	0	0	(0)									
	8/5					N	60	10,900	(24,000)									
Discharge from No. 7 BF and sintering plant thickeners and BF cooling water (004)	7/30	60.7	(16.0)	7.3-8.4	33-45	G	23	1400	(3080)	5.0	303	(668)	4.4	267	(588)	1.0	61	(134)
	7/31	60.7	(16.0)	7.3-8.3	33-37	G	28	1700	(3750)	2.0	121	(267)	1.6	97	(214)	1.0	61	(134)
	8/1	60.3	(15.9)	7.8-8.4	32-37	G	25	1510	(3330)	1.5	91	(200)	1.3	78	(173)	8.7	524	(1160)
	8/2	51.2	(13.5)	7.9-8.6	34-39	G	38	1950	(4290)	7.0	360	(790)	6.1	313	(689)	8.3	425	(934)
	8/3	41.5	(11.0)	7.7-8.1	32-35	G	18	746	(1650)	1.0	41	(92)	0.8	33	(73)	5.7	237	(521)
	8/4	43.1	(11.4)	7.3-8.2	33-36	G	26	1120	(2470)	0.5	21	(47)	0.5	21	(47)	7.0	302	(665)
	8/5	40.9	(10.8)	7.3-8.3	32-35	G	71	2900	(6390)	0.2	8.1	(18)	0.2	8.1	(18)	7.8	319	(703)

TABLE 3 (cont.)
SUMMARY OF FIELD MEASUREMENTS AND ANALYTICAL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date[2]	Flow m^3/day X 10^3	Flow (mgd)	pH Range	Temp °C Range	Gross[3] / Net	TSS mg/l	TSS kg/day	TSS (lb/day)	Total CN mg/l	Total CN kg/day	Total CN (lb/day)	Amenable CN mg/l	Amenable CN kg/day	Amenable CN (lb/day)	Ammonia (N) mg/l	Ammonia (N) kg/day	Ammonia (N) (lb/day)
Discharge from No. 7 SF thickener (104)	7/30	9.8	(2.6)	7.2-7.2	39-47	G	14	136	(300)	20	194	(428)	19	185	(407)	2.6	26	(56)
	7/31	8.1	(2.1)	7.1-7.6	41-43	G	21	171	(375)	8	65	(143)	7.1	57	(127)	2.7	22	(48)
	8/1	12.3	(3.3)	7.3-7.6	41-45	G	14	172	(381)	5	62	(135)	4.5	56	(123)	24	296	(652)
	8/2[4]	5.1	(1.3)			G	43	216	(476)	88	442	(977)	82	412	(908)	29	146	(321)
	8/2[4]	1.2	(0.32)	7.4-8.5	44-51	G	54	67	(147)	25	31	(68)	21	26	(57)	32	39	(87)
	8/3	1.7	(0.45)	7.4-8.1	42-45	G	36	61	(134)	20	33	(74)	18	30	(67)	46	77	(170)
	8/4	1.6	(0.43)	7.3-7.9	41-44	G	16	26	(57)	2	3.3	(7.1)	1.5	2.4	(5.4)	52	84	(186)
	8/5	1.5	(0.38)	7.3-7.8	39-45	G	34	49	(107)	1	1.5	(3.2)	1	1.5	(3.2)	53	75	(166)
	7/30					N	0	0	(0)	19.96	195	(428)	18.96	184	(406)	1.97	19	(42)
	7/31					N	2	16	(36)	7.96	63	(139)	7.06	57	(126)	2.00	16	(36)
	8/1					N	2	25	(54)	4.98	62	(135)	4.48	55	(122)	23.24	287	(632)
	8/2					N	15	75	(166)	87.95	442	(977)	81.95	411	(908)	28.67	144	(318)
	8/2					N	26	32	(70)	24.95	31	(68)	20.95	26	(57)	31.67	39	(86)
	8/3					N	9	15	(33)	19.97	33	(71)	17.97	30	(67)	45.18	76	(168)
	8/4					N	0	0	(0)	1.97	3.2	(7.0)	1.47	2.4	(5.2)	51.06	83	(183)
	8/5					N	0	0	(0)	0.98	1.4	(3.1)	0.98	1.4	(3.1)	52.18	75	(164)
Discharge from sintering plant thickener (204)	7/30	5.1	(1.3)	8.0-8.7	39-42	G	82	416	(917)	11	56	(123)	6.8	34	(75)	2.4	12	(27)
	7/31	5.1	(1.3)	8.0-8.4	39-42	G	130	653	(1440)	6.5	33	(72)	5.3	27	(59)	2.4	12	(27)
	8/1	4.3	(1.1)	7.4-8.6	41-43	G	92	391	(866)	4.5	19	(42)	3.8	16	(36)	22	93	(206)
	8/2	4.5	(1.2)	8.1-8.7	43-46	G	150	676	(1490)	40	180	(398)	34	153	(338)	27	122	(268)
	8/3	4.7	(1.3)	7.8-8.2	44-46	G	43	203	(449)	21	99	(219)	21	99	(219)	39	184	(407)
	8/4	5.3	(1.4)	7.7-8.2	42-44	G	66	353	(778)	2.5	14	(29)	2.5	14	(29)	49	262	(578)
	8/5	4.7	(1.2)	7.3-7.9	42-43	G	54	252	(556)	1.0	4.6	(10)	0.8	3.8	(8.2)	44	206	(452)
	7/30					N	52	263	(580)	10.96	56	(123)	6.76	34	(75)	1.77	8.6	(20)
	7/31					N	111	557	(1230)	6.46	33	(72)	5.26	27	(58)	1.70	8.6	(19)
	8/1					N	80	339	(749)	4.48	19	(42)	3.78	16	(35)	21.24	90	(199)
	8/2					N	122	548	(1210)	39.95	180	(398)	33.95	153	(337)	26.67	120	(265)
	8/3					N	16	75	(167)	20.97	99	(219)	20.97	99	(219)	38.18	181	(399)
	8/4					N	16	86	(189)	2.47	13	(29)	2.47	13	(29)	48.06	257	(566)
	8/5					N	4	19	(41)	0.98	4.5	(10)	0.78	3.6	(8.1)	43.18	201	(445)

TABLE 3 (cont.)
SUMMARY OF FIELD MEASUREMENTS AND ANALYTICAL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date[2]	Flow m^3/day X 10^3	Flow (mgd)	pH Range	Temp °C Range	Gross[3]	TSS mg/l	TSS kg/day	TSS (lb/day)	Total CN mg/l	Total CN kg/day	Total CN (lb/day)	Amenable CN mg/l	Amenable CN kg/day	Amenable CN (lb/day)	Ammonia (N) mg/l	Ammonia (N) kg/day	Ammonia (N) (lb/day)
Discharge from BOP thickener and cooling water (010)	7/30	25.0	(6.61)	10.2-10.7	30-33	G	37	926	(2340)									
	7/31	26.1	(6.89)	10.6-10.9	30-37	G	47	1226	(2700)									
	8/1	30.2	(8.0)	10.9-11.1	34-38	G	42	1350	(2790)									
	8/2	22.7	(6.01)	10.7-11.0	35-39	G	120	2730	(6020)									
	8/3	20.7	(5.46)	10.3-10.9	38-42	G	47	968	(2140)									
	8/4	21.1	(5.57)	10.4-11.0	37-40	G	190	4000	(8830)									
	8/5	20.8	(5.50)	8.8-11.5	35-39	G	53	1110	(2430)									
Discharge from BOP thickener (110)	7/30	12.3	(3.3)	10.5-11.1	33-40	G	19	234	(516)									
	7/31	14.0	(3.7)	11.0-11.2	35-42	G	22	307	(676)									
	8/1	14.0	(3.7)	11.1-11.4	40-48	G	17	237	(523)									
	8/2	13.3	(3.5)	10.9-11.3	44-46	G	36	478	(1050)									
	8/3	12.9	(3.4)	10.5-11.0	38-46	G	20	260	(572)									
	8/4	12.0	(3.2)	10.6-11.7	43-46	G	41	492	(1090)									
	8/5	12.9	(3.4)	9.2-11.5	41-45	G	14	182	(400)									
	7/30					N	0	0	(0)									
	7/31					N	3	42	(93)									
	8/1					N	5	69	(153)									
	8/2					N	8	106	(235)									
	8/3					N	0	0	(0)									
	8/4					N	0	0	(0)									
	8/5					N	0	0	(0)									
Central pump house water intake	7/30			7.4-8.0	26-27	G	30			0.04			0.04			0.63		
	7/31			7.1-8.4	26-29	G	19			0.04			0.04			0.70		
	8/1			7.5-7.8	27-30	G	12			0.02			0.02			0.76		
	8/2			7.4-8.0	29-30	G	28			0.05			0.05			0.33		
	8/3			7.1-7.7	28-30	G	27			0.03			0.03			0.82		
	8/4			7.4-7.9	29-33	G	50			0.03			0.03			0.94		
	8/5			7.0-8.1	28-30	G	50			0.02			0.02			0.82		

TABLE 3 (cont.)
SUMMARY OF FIELD MEASUREMENTS AND ANALYTICAL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date[2]	Flow m^3/day X 10^{-3}	Flow (mgd)	pH Range	Temp °C Range	Gross[3] / Net	TSS mg/l	TSS kg/day	TSS (lb/day)	Total CN mg/l	Total CN kg/day	Total CN (lb/day)	Amenable CN mg/l	Amenable CN kg/day	Amenable CN (lb/day)	Ammonia (N) mg/l	Ammonia (N) kg/day	Ammonia (N) (lb/day)

[1]All samples are 24 hour composites except where noted.
[2]Date is day sample was composited (i.e., 24 hr composite 0600 July 29 to 0600 July 30 was dated July 30.)
[3]Credit is given for intake concentrations where specified in the permit or adjudicatory hearing request.
[4]Based on grab samples.
[5]This is the average flow based on the last 6 days of sampling.
[6]Due to tampering with dye injection equipment, these results are not necessarily accurate (i.e., composite sample proportioned from erroneous flow data.) In addition the flow for this date is probably higher than the actual rate.
[7]Based on 12-hour composites as the thickener flow decreased due to taking a BF out of service. Loads are for 12 hrs, not for the day.

TABLE 4
SUMMARY OF OIL AND GREASE AND PHENOL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date	Time	Instantaneous[2] Flow $m^3/Day \times 10^3$	(mgd)	Oil and Grease[3] (Gross) mg/l	kg/day	(lb/day)	Phenol Gross µg/l	kg/day	(lb/day)	Phenol Net[4] µg/l	kg/day	(lb/day)
Cooling water discharge into Turtle Creek (001)[5]	8/2	0945			36								
		1350			18			4					
	8/3	1035			16			2					
	8/4	0735			51			2					
Discharge from No. 1 and 2 BF thickener and BF cooling water (002W)	7/29	1120						56					
		1210						66					
		1515						57					
	7/30	0010						10					
		0310						10					
		1830	689	(182)				6	4.1	(9.1)			
	7/31	0010	598	(158)				37	22.1	(48.8)			
		0300	594	(157)				28	16.6	(36.7)			
		2105	477	(126)				15	7.1	(15.8)			
	8/1	0015	477	(126)				3	1.4	(3.2)			
		1550	617	(163)				25	15.4	(34.0)			
		2105	655	(173)				26	17.0	(37.5)			
	8/2	0030	670	(177)				28	18.7	(41.3)			
		0315	636	(168)				40	25.4	(56.0)			
		1800	640	(169)				100	63.9	(141.0)			
	8/3	0005	587	(155)				69	40.5	(89.2)			
		0315	666	(176)				26	17.3	(38.2)			
		1810	749	(198)				37	27.7	(61.1)			
	8/4	0310	621	(164)				53	32.9	(72.5)			
		0910	662	(175)				73	48.3	(107.0)			
		1220	814	(215)				42	34.2	(75.3)			
Discharge from No. 1 and 2 BF thickener (102)	7/29	1055	32	(8.7)				870	28.5	(62.8)	868	28.5	(62.8)
		1357	40	(10.5)				980	39.1	(86.1)	976	39.0	(86.0)
		1645	46	(12.2)				590	27.4	(60.3)	587	27.3	(60.0)
	7/30	0145	26	(6.7)				290	5.4	(16.2)	288	7.3	(16.0)
		0505	34	(9.1)				180	6.2	(13.6)	178	6.1	(13.4)
		2210	23	(6.2)				360	8.4	(18.5)	355	8.3	(18.2)

TABLE 4 (cont.)
SUMMARY OF OIL AND GREASE AND PHENOL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date	Time	Instantaneous[2] Flow m^3/Day x 10^3	(mgd)	Oil and Grease[3] (Gross) mg/l	kg/day	(lb/day)	Phenol Gross µg/l	kg/day	(lb/day)	Phenol Net[4] µg/l	kg/day	(lb/day)
Discharge from No. 1 and 2 BF thickener (102) (cont'd)	7/31	0135	39	(10.2)				530	20.5	(45.1)	526	20.3	(44.7)
		0415	27	(7.1)				600	16.1	(35.6)	598	16.1	(35.5)
		2245	21	(5.7)				190	4.1	(9.1)	186	4.0	(8.9)
	8/1	0140	31	(8.1)				47	1.5	(3.2)	44	1.4	(2.9)
		1645	34	(9.0)				210	7.1	(15.8)	209	7.1	(15.7)
		1920	33	(8.6)				370	12.0	(26.5)	367	11.9	(25.2)
	8/2	0145	35	(9.2)				660	23.1	(50.9)	652	22.8	(50.3)
		0445	47	(12.5)				1000	47.5	(104.5)	994	47.0	(104.0)
		1910	39	(10.5)				1700	67.3	(148.3)	1695	66.8	(148.0)
	8/3	0100	41	(10.9)				800	32.9	(72.8)	792	32.7	(71.9)
		0415	31	(8.1)				240	7.4	(16.3)	238	7.4	(16.2)
		1910	39	(10.3)				650	25.3	(55.8)	642	25.0	(55.1)
	8/4	0415	39	(10.3)				800	31.1	(68.6)	796	30.9	(68.3)
		1025	45	(11.9)				1300	58.6	(129.0)	1299	58.5	(129.0)
		1315	22	(6.0)				1200	27.2	(60.0)	1187	26.9	(59.4)
Discharge from settling basin (003)	7/29	0915	305	(80.6)	65	19,800	(43,700)						
		1225	199	(52.6)	39	7,760	(17,100)						
		1530	194	(51.2)	17	3,290	(7,260)						
	7/30	0020	207	(54.6)	47	9,710	(21,400)						
		0330	243	(64.2)	59	14,300	(31,600)						
		1830	170	(45.0)	21	3,570	(7,880)						
	7/31	0025	238	(62.8)	35	8,320	(18,330)						
		0315	245	(64.7)	37	9,060	(20,000)						
		2135	515	(136.0)	25	12,800	(28,300)						
	8/1	0040	261	(69.0)	26	6,790	(15,000)						
		1530	255	(67.4)	23	5,860	(12,900)						
		1830	239	(63.1)	25	5,970	(13,200)						
	8/2	0040	214	(56.6)	31	6,640	(14,600)						
		0330	191	(50.5)	31	5,920	(13,100)						
		1805	254	(67.1)	55	14,000	(30,800)						

TABLE 4 (cont.)
SUMMARY OF OIL AND GREASE AND PHENOL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date	Time	Instantaneous[2] Flow $m^3/Day \times 10^3$	(mgd)	Oil and Grease[3] (Gross) mg/l	kg/day	(lb/day)	Phenol Gross µg/l	kg/day	(lb/day)	Phenol Net[4] µg/l	kg/day	(lb/day)
Discharge from settling basin (003) (cont'd)	8/3	0015	220	(58.2)	30	6,610	(14,600)						
		0335	239	(63.1)	34	8,120	(17,900)						
		1820	262	(69.3)	35	9,180	(20,300)						
	8/4	0325	188	(49.7)	28	5,260	(11,600)						
		0925	170	(44.8)	59	10,000	(22,000)						
		1225	193	(50.9)	61	11,746	(25,900)						
Discharge from No. 7 BF and sinter plant thickeners and BF cooling water (004)	7/29	0955	38	(9.9)				110	4.1	(9.1)			
		1310	52	(11.9)				160	8.4	(18.5)			
		1735	79	(20.9)				130	10.3	(22.7)			
	7/30	0050	68	(18.0)				300	20.4	(45.0)			
		0420	63	(16.8)				350	22.3	(49.0)			
		1930	53	(14.1)				74	3.9	(8.7)			
	7/31	0050	50	(13.1)				65	3.3	(7.1)			
		0335	53	(14.0)				100	5.3	(11.7)			
		2200	79	(20.9)				150	11.8	(26.1)			
	8/1	0100	51	(13.6)				180	9.3	(20.5)			
		1505	76	(20.2)				240	18.3	(40.4)			
		1840	46	(12.2)				32	1.5	(3.3)			
	8/2	0100	43	(11.3)				47	2.0	(4.5)			
		0345	47	(12.3)				37	1.7	(3.8)			
		1830	38	(9.9)				30	1.1	(2.5)			
	8/3	0025	32	(8.4)				72	2.3	(5.1)			
		0325	40	(10.5)				52	2.1	(4.5)			
		1840	47	(12.5)				44	2.1	(4.6)			
	8/4	0340	36	(9.5)				51	1.8	(4.0)			
		0940	45	(11.8)				86	4.2	(8.5)			
		1240	42	(11.0)				88	3.7	(8.1)			

TABLE 4 (cont.)
SUMMARY OF OIL AND GREASE AND PHENOL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date	Time	Instantaneous[2] Flow $m^3/Day \times 10^3$	(mgd)	Oil and Grease[3] (Gross) mg/l	kg/day	(lb/day)	Phenol Gross µg/l	kg/day	(lb/day)	Phenol Net[4] µg/l	kg/day	(lb/day)
Discharge from No. 7 BF thickener (104)	7/29	1045	11.0	(2.89)				490	5.3	(10.1)	488	5.3	(11.7)
		1339	12.3	(3.32)				500	6.1	(13.5)	496	6.1	(13.4)
		1530	7.8	(2.07)				400	3.1	(6.9)	397	3.1	(6.9)
	7/30	0130	9.9	(2.60)				1100	10.9	(23.8)	1098	10.8	(23.7)
		0450	8.7	(2.30)				1200	10.4	(23.0)	1198	10.4	(23.0)
		1955	6.7	(1.76)				270	1.8	(3.9)	265	1.8	(3.9)
	7/31	0120	8.1	(2.13)				370	3.0	(6.6)	366	2.9	(6.5)
		0405	8.1	(2.16)				490	4.0	(8.8)	488	4.0	(8.8)
		2230	12.3	(3.27)				740	9.2	(20.1)	736	9.1	(20.0)
	8/1	0125	12.9	(3.42)				880	11.4	(25.1)	877	11.3	(25.0)
		1630	9.2	(2.43)				890	8.2	(18.0)	889	8.2	(18.1)
		1915	2.6	(0.68)				810	2.0	(4.3)	807	2.1	(4.5)
	8/2	0130	1.5	(0.39)				1300	2.1	(4.5)	1292	2.0	(4.3)
		0430	4.1	(1.08)				1300	5.3	(11.7)	1294	5.3	(11.7)
		1855	1.7	(0.46)				930	1.6	(3.6)	926	1.6	(3.6)
	8/3	0050	1.9	(0.49)				1200	2.2	(4.9)	1192	2.2	(4.9)
		0400	1.5	(0.39)				960	1.4	(3.1)	958	1.4	(3.1)
		1900	1.7	(0.46)				1100	1.9	(4.3)	1092	1.6	(4.2)
	8/4	0405	1.5	(0.39)				1500	2.2	(4.8)	1496	2.1	(4.8)
		1010	1.5	(0.38)				1600	2.3	(5.1)	1599	2.3	(5.1)
		1310	1.3	(0.33)				1700	2.1	(4.7)	1687	2.1	(4.7)
Discharge from sintering plant thickener (204)	7/29	1032	5.6	(1.47)	20	110	(244)	750	4.2	(9.2)	748	4.1	(9.2)
		1620	5.3	(1.41)	37	198	(436)	260	1.4	(3.1)	257	1.4	(3.0)
	7/30	0130	6.3	(1.67)	30	189	(418)	300	1.9	(4.2)	298	1.9	(4.1)
		0450	5.6	(1.47)	26	145	(320)	240	1.4	(2.9)	238	1.3	(2.9)
		2000	6.1	(1.61)	42	256	(564)	130	0.8	(1.7)	125	0.8	(1.7)
	7/31	0120	3.0	(0.79)	44	131	(290)	88	0.3	(0.6)	84	0.26	(0.5)
		0450	5.8	(1.53)	33	191	(422)	160	0.9	(2.1)	158	0.9	(2.1)
		2230	4.6	(1.23)	100	464	(1020)	470	2.1	(4.8)	466	2.1	(4.8)

TABLE 4 (cont.)
SUMMARY OF OIL AND GREASE AND PHENOL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date	Time	Instantaneous[2] Flow m^3/Da_y x 10^3	(mgd)	Oil and Grease[3] (Gross) mg/l	kg/day	(lb/day)	Phenol Gross µg/l	kg/day	(lb/day)	Phenol Net[4] µg/l	kg/day	(lb/day)
Discharge from sintering plant thickener (204) (cont'd)	8/1	0130	4.4	(1.16)	68	297	(656)	150	0.7	(1.5)	147	0.7	(1.5)
		1630	6.0	(1.58)	9	54	(118)	120	0.7	(1.5)	119	0.7	(1.5)
		1915	5.1	(1.35)	12	61	(135)	170	0.9	(1.9)	167	0.9	(1.9)
	8/2	0130	5.0	(1.30)	37	183	(402)	24	0.1	(0.3)	16	0.1	(0.2)
		0430	3.9	(1.01)	10	39	(84)	32	0.1	(0.3)	26	0.1	(0.3)
		1855	4.8	(1.27)	29	139	(307)	330	1.5	(3.5)	326	1.5	(3.4)
	8/3	0050	5.1	(1.35)	55	182	(621)	760	3.9	(8.6)	752	3.9	(8.5)
		0400	4.7	(1.25)	43	203	(499)	330	1.5	(3.4)	328	1.5	(3.4)
		1900	5.3	(1.41)	24	129	(283)	640	3.4	(7.5)	632	3.3	(7.5)
	8/4	0400	5.0	(1.32)	48	240	(528)	720	3.6	(7.9)	716	3.6	(7.9)
		1010	4.6	(1.22)	54	249	(548)	1000	4.6	(10.1)	999	4.6	(10.1)
		1310	4.9	(1.30)	34	166	(367)	1100	5.4	(11.9)	1087	5.3	(11.7)
Central pump house intake water	7/29	0930			41			2					
		1240			30			4					
		1530			9			3					
	7/30	0030			12			2					
		0350			13			2					
		1830			9			5					
	7/31	0030			8			4					
		0315[6]						2					
		2145			12			4					
	8/1	0035			10			3					
		1525			23			1					
		1835			16			3					
	8/2	0040			14			8					
		0330			11			6					
		1815			46			4					
	8/3	0020			42			8					
		0330			38			2					
		1820			21			8					
	8/4	0335			26			4					
		0925			38			1					
		1230			34			13					

TABLE 4 (cont.)
SUMMARY OF OIL AND GREASE AND PHENOL DATA[1]
USSC EDGAR THOMSON PLANT
JULY 29-AUGUST 5, 1975

Station Description	Date	Time	Instantaneous[2] Flow $m^3/Day \times 10^3$	(mgd)	Oil and Grease[3] (Gross) mg/l	kg/day	(lb/day)	Phenol Gross ug/l	kg/day	(lb/day)	Phenol Net[4] ug/l	kg/day	(lb/day)

[1]All data based on grab samples.
[2]Loads are calculated using instantaneous flows.
[3]Freon Extractable Material.
[4]Credit is given for intake concentration where specified in permit or adjudicatory hearing request.
[5]Numbers in parenthesis are permit designations.
[6]Sample for O.1 and grease was not representative due to oil buildup in forebay of pump house.

TABLE 5
SUMMARY OF METALS DATA
USSC EDGAR THOMSON PLANT
JULY 30 - AUG. 5, 1975

Station Description	Date[1]	Flow m^3/day X 10^3	mgd	Gross[2] Net	Total Iron mg/l	kg/day	(lb/day)	Dissolved Iron mg/l	kg/day	(lb/day)	Total Copper mg/l	kg/day	(lb/day)	Total Zinc mg/l	kg/day	(lb/day)	Dissolved Zinc mg/l	kg/day	(lb/day)
Cooling water discharge into Turtle Creek (001)	8/2			G	3.7			0.15			0.06			0.09			0.05		
	8/3			G	2.7			0.09			0.09			0.01			0.01		
	8/4			G	6.6			0.09			0.06			0.10			0.02		
Discharge from No. 1 & 2 BF thickener and cooling water (002[4])	7/30	651	(172)[3]	G	2.0	1300	(2870)	0.12	78	(172)	0.06	39	(86)	0.19	124	(273)	0.10	65	(143)
	7/31	738	(195)	G	1.3	960	(2110)	-	-	-	0.06	44	(98)	0.19	140	(309)	-	-	-
	8/1	579	(153)	G	1.2	690	(1540)	0.15	87	(191)	0.06	35	(77)	0.13	75	(166)	0.06	35	(77)
	8/2[5]	609	(161)	G	1.1	670	(1470)	0.09	55	(121)	0.04	24	(54)	0.20	122	(269)	0.08	49	(107)
	8/3	613	(162)	G	1.4	860	(1890)	0.08	49	(108)	0.04	24	(54)	0.51	313	(689)	0.32	196	(432)
	8/4	666	(176)	G	1.6	1070	(2340)	0.04	27	(59)	0.04	27	(59)	0.28	186	(411)	0.16	107	(235)
	8/5	689	(182)	G	3.3	2270	(5010)	0.04	28	(61)	0.04	28	(61)	0.44	303	(668)	0.20	138	(304)
Discharge from No. 1 & 2 BF thickener (102)	7/30	36.3	(9.6)	G	7.1	258	(568)	0.16	5.8	(13)	0.21	7.6	(16.8)	3.3	120	(265)	1.9	68	(150)
	7/31	27.9	(7.4)	G	5.9	165	(363)	0.12	3.3	(7.4)	0.17	4.7	(10.5)	2.4	68	(148)	1.1	32	(69)
	8/1	34.4	(9.1)	G	8.3	285	(629)	0.07	2.4	(5.3)	0.07	2.4	(5.3)	2.0	69	(151)	0.59	21	(45)
	8/2[5]	53.6	(14.1)	G	3.7	198	(436)	0.07	3.8	(8.2)	0.04	2.1	(4.7)	3.2	171	(377)	1.3	70	(154)
	8/3	39.6	(10.5)	G	3.3	130	(288)	0.02	0.77	(1.7)	0.04	1.5	(3.5)	6.0	237	(523)	4.6	182	(400)
	8/4	39.6	(10.5)	G	5.6	221	(489)	0.03	1.20	(2.6)	0.04	1.5	(3.5)	4.5	178	(393)	3.3	131	(288)
	8/5	36.3	(9.6)	G	3.3	120	(264)	0.04	1.5	(3.2)	0.04	1.4	(3.2)	6.4	232	(513)	5.2	189	(416)
	7/30			N	5.5	200	(440)	-	-	-	-	-	-	3.27	119	(261)	-	-	-
	7/31			N	4.5	126	(278)	0	0	0	0.14	3.9	(8.6)	2.32	65	(143)	1.1	31	(68)
	8/1			N	7.5	258	(568)	0.07	2.4	(5.3)	0.05	1.7	(3.8)	1.93	66	(147)	0.58	20	(44)
	8/2[5]			N	2.6	139	(307)	0.07	3.8	(8.2)	0.01	0.5	(1.2)	3.19	170	(376)	1.31	70	(154)
	8/3			N	1.8	71	(157)	0	0	0	0.01	0.4	(0.9)	5.93	235	(517)	4.55	180	(397)
	8/4			N	4.1	162	(358)	0	0	0	0	0	0	4.39	174	(383)	3.30	130	(288)
	8/5			N	-	-	-	0	0	0	-	-	-	-	-	-	5.13	186	(410)
Discharge from No. 7 BF and sintering plant thickening and BF cooling water (004)	7/30	60.7	(16.0)	G	3.0	182	(401)	0.2	15	(32)	0.20	12	(27)	0.74	45	(99)	0.43	26	(57)
	7/31	60.7	(16.0)	G	2.5	152	(333)	0.18	11	(24)	0.14	9	(19)	0.54	33	(72)	0.19	11	(26)
	8/1	60.3	(15.9)	G	3.2	193	(425)	0.16	9	(21)	0.15	9	(20)	1.7	104	(226)	0.85	51	(113)
	8/2	51.2	(13.5)	G	2.1	108	(237)	0.36	19	(40)	0.49	25	(56)	1.4	71	(158)	0.63	33	(71)
	8/3	41.5	(10.9)	G	1.6	66	(146)	0.11	4.5	(10)	0.13	5.4	(12)	0.46	19	(42)	0.16	6.6	(15)
	8/4	43.1	(11.4)	G	2.1	91	(200)	0.06	2.6	(5.7)	0.07	3.0	(6.7)	0.22	9	(21)	0.03	1.3	(2.8)
	8/5	40.9	(10.8)	G	3.4	139	(306)	0.05	2.1	(4.5)	0.05	2.1	(4.5)	0.43	17	(39)	0.07	2.8	(6.3)
Discharge from No. 7 BF thickener (104)	7/30	11.4	(3.0)	G	3.0	29	(64)	0.41	4.0	(8.6)	0.05	0.5	(1.1)	2.8	27	(60)	2.1	21	(45)
	7/31	9.5	(2.5)	G	3.3	27	(59)	0.41	3.3	(7.4)	0.07	0.6	(1.3)	2.8	22	(50)	2.1	17	(38)
	8/1[5]	14.4	(3.8)	G	2.6	32	(70)	0.32	3.9	(8.6)	0.05	0.6	(1.4)	4.8	58	(129)	3.6	44	(98)
	8/2	5.9	(1.55)	G	2.3	11	(26)	1.4	7.0	(15)	0.10	0.5	(1.1)	1.2	6	(13)	0.97	4.9	(11)
	8/2[2]	1.4	(0.38)	G	2.3	2.8	(6.6)	1.2	1.5	(3.3)	0.04	0.1	(0.11)	2.1	2.6	(5.8)	0.54	0.7	(1.5)
	8/3	2.0	(0.52)	G	2.0	3.3	(7.5)	0.60	1.0	(2.2)	0.07	0.1	(0.3)	1.8	3	(5.7)	1.2	2.0	(4.5)
	8/4	1.9	(0.50)	G	3.5	5.7	(13)	0.41	0.7	(1.5)	0.05	0.1	(0.2)	0.81	1.3	(2.9)	0.44	0.7	(1.5)
	8/5	1.7	(0.44)	G	3.4	4.9	(10)	0.18	0.26	(0.6)	0.04	0.1	(0.1)	2.6	3.8	(8.2)	1.4	2.0	(4.5)

TABLE 5 (cont.)
SUMMARY OF METALS DATA
USSC EDGAR THOMSON PLANT
JULY 30 - AUG. 5, 1975

Station Description	Date[1]	Flow m^3/day X 10^3	Flow mgd	Gross[2] Net	Total Iron mg/l	Total Iron kg/day	Total Iron (lb/day)	Dissolved Iron mg/l	Dissolved Iron kg/day	Dissolved Iron (lb/day)	Total Copper mg/l	Total Copper kg/day	Total Copper (lb/day)	Total Zinc mg/l	Total Zinc kg/day	Total Zinc (lb/day)	Dissolved Zinc mg/l	Dissolved Zinc kg/day	Dissolved Zinc (lb/day)
Discharge from	7/30			N	1.4	14	(30)	-	-	-	-	-	-	2.8	27	(60)	-	-	-
No. 7 BF	7/31			N	1.9	15	(34)	0.24	1.9	(4)	0.04	0.3	(0.7)	2.7	22	(48)	2.1	17	(37)
thickener (104)	8/1			N	1.8	22	(50)	0.32	4.3	(9)	0.03	0.3	(0.9)	4.7	58	(128)	3.6	44	(98)
(cont'd)	8/2			N	1.2	6	(14)	1.45	7.3	(16)	0.07	0.3	(0.8)	1.1	5.5	(13)	0.96	4.8	(10)
	8/2			N	1.2	1.5	(3.3)	1.19	1.5	(3.3)	0.01	0.01	(0.03)	2.0	2.5	(5.5)	0.53	0.7	(1.4)
	8/3			N	0.54	0.9	(1.9)	0.49	0.9	(1.8)	0.04	0.1	(0.2)	1.7	2.9	(6.3)	1.2	2.0	(4.4)
	8/4			N	2.00	3.3	(7.1)	0.35	0.6	(1.3)	<0.01	0	0	0.72	1.2	(2.6)	0.43	0.7	(1.5)
	8/5			N	-	-	-	0.13	0.2	(0.4)	-	-	-	-	-	-	1.4	2.0	(4.4)
Discharge from	7/31	5.1	(1.3)	G	16	80	(177)	0.54	2.7	(6.0)	0.05	0.3	(0.5)	3.2	16	(36)	0.26	1.3	(2.9)
sintering plant				N	14.6	74	(162)	0.37	1.9	(4.0)	0.03	0.2	(0.3)	3.16	16	(35)	0.23	1.1	(2.3)
thickener (204)																			
Discharge from	7/30	25.0	(6.61)	G	5.5	137	(302)	0.01	0.3	(0.5)	0.04	1.0	(2.2)	0.12	3.0	(6.6)	<0.01		
BOP thickener	7/31	26.1	(6.88)	G	2.5	65	(143)	0.01	0.3	(0.6)	0.07	1.8	(4.0)	0.08	2.1	(4.6)	<0.01		
and cooling	8/1	30.2	(7.96)	G	4.8	145	(319)	<0.01	0	0	0.04	1.2	(2.7)	0.13	3.9	(8.7)	<0.01		
water (010)	8/2	22.7	(6.01)	G	1.6	36	(81)	0.06	1.4	(3)	0.04	0.9	(2.0)	0.07	1.6	(3.5)	<0.01		
	8/3	20.6	(5.46)	G	2.1	44	(96)	0.03	0.6	(1.4)	0.04	0.9	(1.8)	0.06	1.2	(2.7)	<0.01		
	8/4	21.1	(5.60)	G	39	822	(1808)	0.04	0.9	(1.9)	0.15	3.2	(6.9)	1.7	36	(79)	<0.01		
	8/5	20.8	(5.50)	G	4.8	100	(220)	0.07	1.5	(3.2)	0.04	0.9	(1.8)	0.11	2.3	(5.1)	<0.01		
Discharge from	7/30	12.3	(3.2)	G	1.5	19	(41)	0.09	1.1	(2.4)	0.08	1.0	(2.1)	0.01	0.1	(0.3	0.01	0.1	(0.3)
BOP thickener	7/31	13.9	(3.7)	G	3.1	43	(95)	0.03	0.4	(0.9)	0.03	0.4	(0.9)	0.01	0.2	(0.3)	<0.01	-	-
(110)	8/1	13.9	(3.7)	G	1.6	22	(45)	0.05	0.7	(1.5)	0.03	0.4	(0.9)	0.03	0.4	(0.9)	0	0.4	(0.9)
	8/2	13.3	(3.5)	G	1.8	24	(53)	0.06	0.8	(1.8)	0.04	0.5	(1.3)	<0.01	-	-	<0	-	-
	8/3	12.9	(3.4)	G	2.6	33	(75)	0.01	0.2	(0.3)	0.04	0.5	(1.1)	<0.01	-	-	<	-	-
	8/4	12.0	(3.2)	G	3.9	47	(103)	0.10	1.2	(2.7)	0.03	0.3	(0.8)	<0.01	-	-	[illegible]	-	-
	8/5	12.9	(3.4)	G	2.3	30	(66)	0.01	0.2	(0.3)	0.04	0.5	(1.1)	<0.01	-	-		-	-
	7/30			N	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
	7/31			N	1.7	24	(53)	<0.0	0	0	<0.01	0	0	0	0	0			
	8/1			N	0.82	11	(25)	0.05	0.7	(1.5)	0.01	0.2	(0.3)	0.01	0.2	(0.3)	0.02	0.3	(0.6)
	8/2			N	0.70	9	(21)	0.06	0.8	(1.8)	0.01	0.2	(0.3)						
	8/3			N	1.1	15	(32)	0	0	0	0.01	0.2	(0.3)						
	8/4			N	2.4	28	(63)	0.04	0.5	(1.0)	<0.01	0	0						
	8/5			N	-	-	-	0	0	0	-	-	-						
Central pump	7/30			G	1.6			-			-			0.04			-		
house water	7/31			G	1.4			0.17			0.03			0.06			0.03		
intake	8/1			G	0.78			<0.01			0.02			0.02			<0.01		
	8/2			G	1.1			<0.01			0.03			0.04			<0.01		
	8/3			G	1.5			0.11			0.03			0.09			0.02		
	8/4			G	1.5			0.06			0.12			0.09			<0.01		
	8/5			G	-			0.05			-			-			0.02		

[1]Date is the day that the sample was composited (i.e., 24 hr. composite 0600 July 29 to 0600 July 30 was dated July 30.
[2]Credit is given for intake concentrations where specified in the permit or adjudicatory hearing requests.
[3]Average for other 6 days of flow.
[4]Tampering with dye injection equipment resulted in compositing this sample with improper flow data and calculating a flow higher than actual. Therefore, these results are not correct.
[5]Based on a 12 hr. composite. Flows and loadings are 12 hr. totals.

TABLE 6
SUMMARY OF SELF MONITORING DATA[1]
USSC EDGAR THOMSON PLANT

Station Description	Dates[2]		PARAMETER pH	Temp °C	TSS mg/l	NH_3 mg/l	CN-T mg/l	CN-A mg/l	Phenol mg/l	O&G mg/l	Iron mg/l	TOC mg/l
Cooling Water Discharge into Turtle Creek (001)	1/22-5/5	Range	6.2-10.4	8-22			0.004-0.033	0-0.007	0.12-1.3	0-899.8		4.3-22.2
		Avg					0.013	0.002	0.29	126		10.3
		# Samples	6	4			8	7	8	8		6
Discharge from No. 1 and 2 BF Thickener and BF Cooling Water (002)	1/22 6/16	Range	6.9-7.6	2-40			0.006-0.097	0.003-0.074	0.018-1.225			2.9-12.7
		Avg			140		0.053	0.029	0.161			7.33
		# Samples	12	10	1		10	10	10			8
Discharge from No. 1 and 2 BF Thickener (102)	2/24-5/19	Range			3.0-169.0	0-40.0	0.137-16.68	0.062-16.30	0.018-3.44			5.7-14.0
		Avg			39.7	12.9	3.1	2.9	0.44			9.8
		# Samples			19	19	19	19	19			2
Discharge from Settling Basin at Ingot Mold Foundry (202)	1/23-6/9	Range			23-2850							
		Avg			846		0.006	0.044	0.116			
		# Samples			6		1	1	1			
Discharge from Settling Basin (003)	1/22-6/16	Range	7.4-8.8	12-29	14-411		0.003-0.410	0-0.307	0.016-0.246	0.07-25.6		1.7-34.3
		Avg			106		0.157	0.109	0.068	8.1		12.8
		# Samples	6	5	19		9	9	9	29		9
Discharge from No. 7 BF and Sinter Plant Thickeners and BF Cooling Water (004)	1/15-6/23	Range	6.8-10.8	6-35			0.311-2.991	0.058-2.325	0.018-0.934			7.6-23.6
		Avg					1.12	0.889	0.266			16.1
		# Samples	24	23			10	10	10			9
Discharge from No. 7 BF Thickener (104)	1/16-5/19	Range	7.2-11.7		1-98	0-50	1.07-20.84	0.238-19.31	0.030-4.40			12.0-19.4
		Avg			29	18	6.22	4.58	0.89			16.6
		# Samples	2		25	23	24	21	23			3
Discharge from Sintering Plant Thickener (204)	1/16-5/19	Range	7.0-7.8		34-260	0-50	0.423-18.32	0.017-17.46	0.010-1.01			5.8-30.2
		Avg			104	18	4.95	4.39	0.16			18
		# Samples	2		25	24	25	23	24			2
Discharge from BOP Thickener and Cooling Water (010)	1/22-6/16	Range	6.8-11.5	6-30	16-69		0.004-2.991	0-2.325	0.001-0.492		0.03-0.30	1.1-23.8
		Avg			42		0.341	0.259	0.080		0.09	7.3
		# Samples	15	13	2		9	9	9		8	9
Discharge from BOP Thickener (110)	1/23-6/30	Range	6.8-11.7	6-25	0-288							
		Avg			34							
		# Samples	8	3	35							
Central Pump House Intake Water	1/15-6/30	Range	2.4-7.6	3-25	4-226	0-1.6	0-0.103	0-0.051	0-0.35	0.79	0-0.18	0.5-14.9
		Avg			35	0.82	0.023	0.008	0.04	5.3	0.083	6.8
		# Samples	26	21	41	32	32	29	33	36	10	12

1 *Data provided by USSC in Aug. 29, 1976. Transmittal to Enforcement Director EPA Region III from James L. Hamilton, III.*
2 *Dates of Sample collection not provided for all data; therefore, dates are those that were reported.*

TABLE 7
COMPARISON OF USSC PROPOSED EFFLUENT LIMITATIONS AND SURVEY DATA
USSC EDGAR THOMSON PLANT

Station		Total Suspended Solids				Total Cyanide				Ammonia				Phenol				Oil and Grease			
		Daily Average		Daily Maximum		Daily Average		Daily Maximum		Daily Average		Daily Maximum		Daily Average		Daily Maximum		Daily Average		Daily Maximum	
		kg/day	(lb/day)	kg/day	(lb/day)	kg/day	(lb/day)	kg/day	(lb/day)	kg/day	(lb/day)	kg/day	(lb/day)	kg/day	(lb/day)	kg/day	(lb/day)	kg/day	(lb/day)	kg/day	(lb/day)
102[1]	Proposed Limitations:	2578	(5678)	7743	(17,034)	238	(524)	714	(1572)	1062	(2383)	3246	(7149)	82.2	(181)	246.6	(543)				
	Survey Data:	434	(956)	1230	(2720)	68	(195)	144	(317)	808	(1783)	1160	(2553)	24	(52)	46	(101)				
	No. Days Limitations Exceeded:	0/7				0/7				0/7				0/7							
202	Proposed Limitations:	3393	(7465)	10,179	(22,395)																
	Survey Data:	248	(548)	310	(675)																
	No. Days Limitations Exceeded:	0/7																			
003	Proposed Limitations:	44,448	(97,874)	133,464	(293,620)													2614	(8758)	7842	(17,258)
	Survey Data:	14,700	(32,300)	20,000	(44,000)													8800	(19,468)	10,300	(22,700)
	No. Days Limitations Exceeded:	0/7																6/7			
104[1]	Proposed Limitations:	4096	(9021)	12,288	(27,063)	70.4	(155)	211.2	(465)	559	(1232)	1677	(3696)	48.1	(95)	129.3	(286)				
	Survey Data:	20.4	(45)	75	(166)	(104)	(229)	442	(977)	92.4	(204)	287	(632)	4.6	(10.1)	7.7	(16.9)				
	No. Days Limitations Exceeded:	0/7				2/7				0/7				0/7							
204[1]	Proposed Limitations	180	(396)	547	(1188)	5.3	(7.3)	10	(21.9)	48.6	(107)	146	(321)	2.3	(5.1)	6.9	(15.3)				
	Survey Data:	270	(595)	857	(1230)	58	(128)	160	(398)	124	(273)	257	(566)	22	(416)	4.8	(9.9)				
	No. Days Limitations Exceeded:	2/7				6/7				3/7				0/7							
110	Proposed Limitations:	585	(1287)	1755	(3861)																
	Survey Data:	313	(690)	492	(1090)																
	No. Days Limitations Exceeded:	0/7																			

[1]Loadings based on net discharge.

TABLE 8
SUMMARY OF TOTAL CHROMIUM DATA
USSC EDGAR THOMSON PLANT
DISCHARGE 010
JULY 23 - AUG. 5, 1975

Station Description	Date	Flow m^3/day X 10^3	Flow (mgd)	Total Chromium mg/l	Total Chromium kg/day	Total Chromium (lb/day)
Discharge from BOP thickener and cooling water (010)	7/30	25.0	6.61	0.02	0.5	(1.10)
	7/31	26.0	6.88	< 0.01	-	-
	8/1	30.2	7.96	0.02	0.6	(1.32)
	8/2	22.7	6.01	0.02	0.4	(1.00)
	8/3	20.7	5.46	0.03	0.6	(1.36)
	8/4	21.1	5.57	0.04	0.9	(1.86)
	8/5	20.8	5.50	0.02	0.4	(0.92)
Intake water	7/30			-		
	7/31			0.01		
	8/1			0.01		
	8/2			0.02		
	8/3			0.01		
	8/4			0.02		
	8/5			-		

TABLE 9

RECOMMENDED MONITORING REQUIREMENTS[1]
EDGAR THOMSON PLANT

Outfall	Parameter	Measurement Frequency	Sample Type
Discharge from Ingot Mold Cooling & Tar Pumps (001)	Oil & Grease; TSS	1/month	Grab
	Flow	1/month	Continuously measured & recorded during day.
Discharge from Ingot Mold Foundry and BF Cooling Water (002E)	TSS[2]	2/month	24-hour composite
	Flow	2/month	Continuously measured & recorded during day.
Discharge from Settling Basin Ingot Mold Foundry (202)	TSS	2/month	24-hour composite
	Flow	2/month	Continuously measured & recorded during day.
Discharge from No. 1 & 2 BF thickener and BF Cooling Water (002W)	Total Cyanide	2/month[3]	24-hour composite
	Flow	2/month	Continuously measured & recorded during day.
Discharge from No. 1 & 2 BF Thickener (102)	TSS[4]	1/week	24-hour composite
	Total Cyanide	1/week	24-hour composite
	Phenol	1/week	24-hour composite
	Ammonia	1/week	24-hour composite
	Total Zinc	1/week	24-hour composite
	Flow	Continuous	Continuously measured & recorded during day.
Discharge from Settling Basin (003)(filter backwash, hot forming slab scale pit & BF cooling water)	TSS	3/week	24-hour composite
	O&G	3/week	3 Grabs/24 Hours
	Flow	Continuous	Measured & recorded

TABLE 9 (cont.)

RECOMMENDED MONITORING REQUIREMENTS[1]
EDGAR THOMSON PLANT

Outfall	Parameter	Measurement Frequency	Sample Type
Discharge from No. 7 BF[5] and Sinter Plant Thickeners BF Cooling water (004)	Total Cyanide	2/month	24-hour composite
	Flow	2/month	Continuously measured & recorded during day
Discharge from No. 7 BF Thickener (104)	TSS	1/week	24-hour composite
	Total Cyanide	1/week	24-hour composite
	Phenol	1/week	24-hour composite
	Ammonia	1/week	24-hour composite
	Total Zinc	1/week	24-hour composite
	Flow	Continuous	Measured & recorded
Discharge from Sintering Plant Thickener (204)	TSS	1/week	24-hour composite
	Total Cyanide	1/week	24-hour composite
	Phenol	1/week	24-hour composite
	Ammonia	1/week	24-hour composite
	Total Zinc	1/week	24-hour composite
	O&G	1/week	3 grabs/24 hours
	Flow	Continuous	Measured & recorded
Discharge from BOP Thickener and Cooling Tower Blowdown (010)	TSS	1/week	24-hour composite
	Flow	1/week	Continuously measured & recorded during day
Discharge from BOP Thickener (110)	TSS	1/week	24-hour composite
	Flow	Continuous	Measured & recorded

TABLE 9 (cont.)

RECOMMENDED MONITORING REQUIREMENTS[1]
EDGAR THOMSON PLANT

Outfall	Parameter	Measurement Frequency	Sample Type

[1]Temperature and pH to be monitored a minimum of 4 times each day samples are collected.
[2]Discharge 002E and 202 are to be sampled the same day.
[3]Discharge 002W is to be sampled on days when 102 is sampled.
[4]In addition to these requirements, samples are to be collected the day a blast furnace is either taken out or put into service.
[5]Discharge 004 is to be sampled on days when 104 and 204 are sampled.

Note: To determine total waste loads discharged, all sampling must be done the same day.

REFERENCES

[1]Letter dated August 29, 1975 with attachments from Mr. James L. Hamilton III, Manager Environmental Control Water, United States Steel Corporation to Mr. Stephen R. Wassersug, Director, Enforcement Division, U. S. Environmental Protection Agency, Region III.

[2]Letter dated August 1, 1975, with attachments from Mr. James L. Hamilton III, Manager Environmental Control Water, United States Steel Corporation to Mr. Stephen R. Wassersug, Director, Enforcement Division, U. S. Environmental Protection Agency, Region III.

[3]"Evaluation of Wastewater Treatment for United States Steel Corporation at Edgar Thomson Works," prepared by Hydro-Technic Corporation, 641 Lexington Avenue, New York, N. Y., 1975.

APPENDICES

A Study Methods

B Analytical Procedures and Quality Control

C Chain of Custody Procedures

D Letter: Dye Injection Equipment

E Letter: Oil Spill

F Letter: Reconnaissance Visit - ET Plant

APPENDIX A

STUDY METHODS

A. Sampling and Compositing Techniques

Information was obtained through interviews with plant officials on water pollution control practices and in-plant surveys.

Influent water samples from the Monongahela River, collected from the forebay of the pumphouse, were time composited (i.e., equal portions from each grab sample). Effluent samples, except Discharge 001, were flow composited according to instantaneous flow readings obtained at the point of collection. Aliquots for the composites were collected manually every three hours. Discharge 001 was grab sampled four times during the survey.

Samples for chemical analyses were collected in clean containers. Each time a sample was collected field measurements of pH, temperature and conductivity were made. Samples were delivered to the NEIC mobile laboratory (McKeesport, Pennsylvania) and analyzed for selected parameters (e.g., oil and grease and total suspended solids). Appropriate preserved aliquots were shipped to the NEIC laboratory (Denver, Colorado) and analyzed for total and amenable cyanide, heavy metals, ammonia, phenolic materials and organics. All samples collected were split with USSC.

B. Flow Measurement Techniques

Continuous flow monitoring of discharges is specified in the NPDES permit proposed by Region III, EPA. Flow measurements of selected discharge points by NEIC personnel commenced July 29, 1975.

The procedure used at these points, with the exception of Outfalls 202 and 001, was the tracer dilution method. The flow through Outfall 202 was measured using a Marsh McBirney portable water meter to determine velocities from which the flow was calculated. Outfall 001 was surcharged at the point of discharge. Although positive flow to the river was obvious, accurate flow measurement and representative sampling was not possible.

Rhodamine WT dye produced exclusively by duPont DeNemours, E. I. and Company, was selected as the tracer because of its low sorptive tendency and high stability to varying pH conditions.

Injection Procedure

Dye was injected upstream at a location which would allow thorough mixing at the sampling station. A metering pump* was used for dye injection. Tygon R** tubing was used to connect the pump to the dye

*Model RPIBG7 pump manufactured by Fluid Metering Inc.
**Trade name.

storage container and also for the discharge line. A hypodermic needle was inserted into the end of the discharge line to provide back pressure on the pump and prevent air bubble formation in the line. Dye injection rates were measured twice per day to assure a uniform rate.

Fluorometric Analysis Procedure

All dye samples for flow measurements were analyzed using a G. K. Turner Model III fluorometer. A calibration curve was developed for each scale by plotting fluorescence readings against dye standards of known concentration. The standards were measured each day to verify that the relationship of fluorescence readings to known dye concentration remained stable (Table 1).

Samples for fluorometric analyses were collected in a stainless steel 1.83 liter breaker (rinsed with a portion of the waste stream three times before collection of the sample) and poured into a 125 ml polyethylene sample container (also rinsed three times with sample before collection). Samples for background fluorescence were collected upstream of each injection location. Fluorescence readings at flow sampling points were then corrected for the background fluorescence.

TABLE 1

DAILY STANDARD CHECK

Date	Time	Standard Concentration (Initial, ppb)	Corrected Fluorometer Reading	Concentration (Calculated from fluorometer, ppb)
7/29/75	0820	10	36.9	10.2
7/30/75	0812	25	21.2	24.8
7/31/75	0852	25	22.0	25.5
8/1/75	1436	25	22.0	25.5
8/2/75	1500	25	21.2	24.6
8/3/75	1255	25	21.0	24.5
8/4/75	1035	25	21.2	24.6

APPENDIX B

ANALYTICAL PROCEDURES AND QUALITY CONTROL

Samples collected during this survey were analyzed, where appropriate, according to procedures approved by EPA for the monitoring industrial effluents.[1/] The analytical procedures for characterizing trace organic chemical pollutants are described below. The remaining procedures are listed in the following table.

Parameter	Method	Reference
Al, Cr, Fe, Pb, Sn, Zn, Cu	Atomic Absorption	EPA Methods for Chemical Analyses of Water and Wastewater, 1971, page 83
TSS	Gravimetric	ibid., page 278
Cyanide	Distillation, Colorimetric	ibid., page 41
Phenol	Automated Colorimetric	EPA Methods for Chemical Analyses of Water & Wastes, 1974, page 243
Ammonia	Automated Phenate	ibid., page 168
Oil & Grease	Freon Extraction	Standard Methods 13th Ed., page 254
BOD	Serial Dilution (Winkler-Azide)	ibid., page 489
Hexavalent Chromium	Colorimetric	ibid., page 429

Samples for organic chemical pollutant analysis were collected in clean, solvent rinsed one-gallon glass containers. These samples were air freighted to Denver and extracted with methylene chloride. The extract was dried with anhyd. sodium sulfate, concentrated, exchanged into acetone, and analyzed by hydrogen flame ionization gas chromatography. Those samples that showed adequate response were set aside for characterization by

combined gas chromatography-mass spectrometry (GC/MS). The GC/MS analyses were carried out with a Finnigan Model 1015 Quadrapole Mass Spectrometer and a Systems Industries Model 150 computerized data system. Mass spectra were compared to data files in the NIH Computer System and also to listings in the Eight Peak Index of Mass Spectra, Second Edition, 1974, compiled by the Mass Spectrometry Data Center. All identifications are considered preliminary until authentic standards of the suspected chemical compounds can be obtained and analyzed under similar conditions to match the mass spectrum and gas chromatographic retention time. This procedure does not detect highly volatile organic chemical pollutants since their presence is masked by the extraction solvent.

Reliability of the analytical results was documented through an active Analytical Quality Control Program. As part of this program, replicate analyses were normally performed with every tenth sample to ascertain the reproducibility of the results. In addition, where appropriate, every tenth sample was spiked with a known amount of the constituents to be measured and reanalyzed to determine the percent recovery. These results were evaluated in regard to past AQC data on the precision, accuracy, and detection limits of each test. On the basis of these findings, all analytical results reported for the survey were found to be acceptable with respect to the precision and accuracy control of this laboratory.

1/ Federal Register, Vol. 40, No. 111, June 9, 1975.

APPENDIX C

ENVIRONMENTAL PROTECTION AGENCY
Office Of Enforcement
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
Building 53, Box 25227, Denver Federal Center
Denver, Colorado 80225

July 24, 1974

CHAIN OF CUSTODY PROCEDURES

General:

The evidence gathering portion of a survey should be characterized by the minimum number of samples required to give a fair representation of the effluent or water body from which taken. To the extent possible, the quantity of samples and sample locations will be determined prior to the survey.

Chain of Custody procedures must be followed to maintain the documentation necessary to trace sample possession from the time taken until the evidence is introduced into court. A sample is in your "custody" if:

1. It is in your actual physical possession, or
2. It is in your view, after being in your physical possession, or
3. It was in your physical possession and then you locked it up in a manner so that no one could tamper with it.

All survey participants will receive a copy of the survey study plan and will be knowledgeable of its contents prior to the survey. A pre-survey briefing will be held to re-appraise all participants of the survey objectives, sample locations and Chain of Custody procedures. After all Chain of Custody samples are collected, a de-briefing will be held in the field to determine adherence to Chain of Custody procedures and whether additional evidence type samples are required.

Sample Collection:

1. To the maximum extent achievable, as few people as possible should handle the sample.
2. Stream and effluent samples shall be obtained, using standard field sampling techniques.
3. Sample tags (Exhibit I) shall be securely attached to the sample container at the time the complete sample is collected and shall contain, at a minimum, the following information: station number, station location, date taken, time taken, type of sample, sequence number (first sample of the day - sequence No. 1, second sample - sequence No. 2, etc.), analyses required and samplers. The tags must be legibly filled out in ballpoint (waterproof ink).

Chain of Custody Procedures (Continued)

Sample Collection (Continued)

4. Blank samples shall also be taken with preservatives which will be analyzed by the laboratory to exclude the possibility of container or preservative contamination.

5. A pre-printed, bound Field Data Record logbook shall be maintained to record field measurements and other pertinent information necessary to refresh the sampler's memory in the event he later takes the stand to testify regarding his action's during the evidence gathering activity. A separate set of field notebooks shall be maintained for each survey and stored in a safe place where they could be protected and accounted for at all times. Standard formats (Exhibits II and III) have been established to minimize field entries and include the date, time, survey, type of samples taken, volume of each sample, type of analysis, sample numbers, preservatives, sample location and field measurements such as temperature, conductivity, DO, pH, flow and any other pertinent information or observations. The entries shall be signed by the field sampler. The preparation and conservation of the field logbooks during the survey will be the responsibility of the survey coordinator. Once the survey is complete, field logs will be retained by the survey coordinator, or his designated representative, as a part of the permanent record.

6. The field sampler is responsible for the care and custody of the samples collected until properly dispatched to the receiving laboratory or turned over to an assigned custodian. He must assure that each container is in his physical possession or in his view at all times, or locked in such a place and manner that no one can tamper with it.

7. Colored slides or photographs should be taken which would visually show the outfall sample location and any water pollution to substantiate any conclusions of the investigation. Written documentation on the back of the photo should include the signature of the photographer, time, date and site location. Photographs of this nature, which may be used as evidence, shall also be handled recognizing Chain of Custody procedures to prevent alteration.

Transfer of Custody and Shipment:

1. Samples will be accompanied by a Chain of Custody Record which includes the name of the survey, samplers signatures, station number, station location, date, time, type of sample, sequence number, number of containers and analyses required (Fig. IV). When turning over the possession of samples, the transferor and transferee will sign, date and time the sheet. This record sheet

allows transfer of custody of a group of samples in the field, to the mobile laboratory or when samples are dispatched to the NFIC - Denver laboratory. When transferring a portion of the samples identified on the sheet to the field mobile laboratory, the individual samples must be noted in the column with the signature of the person relinquishing the samples. The field laboratory person receiving the samples will acknowledge receipt by signing in the appropriate column.

2. The field custodian or field sampler, if a custodian has not been assigned, will have the responsibility of properly packaging and dispatching samples to the proper laboratory for analysis. The "Dispatch" portion of the Chain of Custody Record shall be properly filled out, dated, and signed.

3. Samples will be properly packed in shipment containers such as ice chests, to avoid breakage. The shipping containers will be padlocked for shipment to the receiving laboratory.

4. All packages will be accompanied by the Chain of Custody Record showing identification of the contents. The original will accompany the shipment, and a copy will be retained by the survey coordinator.

5. If sent by mail, register the package with return receipt requested. If sent by common carrier, a Government Bill of Lading should be obtained. Receipts from post offices and bills of lading will be retained as part of the permanent Chain of Custody documentation.

6. If samples are delivered to the laboratory when appropriate personnel are not there to receive them, the samples must be locked in a designated area within the laboratory in a manner so that no one can tamper with them. The same person must then return to the laboratory and unlock the samples and deliver custody to the appropriate custodian.

Laboratory Custody Procedures:

1. The laboratory shall designate a "sample custodian." An alternate will be designated in his absence. In addition, the laboratory shall set aside a "sample storage security area." This should be a clean, dry, isolated room which can be securely locked from the outside.

2. All samples should be handled by the minimum possible number of persons.

3. All incoming samples shall be received only by the custodian, who will indicate receipt by signing the Chain of Custody Record Sheet

accompanying the samples and retaining the sheet as permanent records. Couriers picking up samples at the airport, post office, etc. shall sign jointly with the laboratory custodian.

4. Immediately upon receipt, the custodian will place the sample in the sample room, which will be locked at all times except when samples are removed or replaced by the custodian. To the maximum extent possible, only the custodian should be permitted in the sample room.

5. The custodian shall ensure that heat-sensitive or light-sensitive samples, or other sample materials having unusual physical characteristics, or requiring special handling, are properly stored and maintained.

6. Only the custodian will distribute samples to personnel who are to perform tests.

7. The analyst will record in his laboratory notebook or analytical worksheet, identifying information describing the sample, the procedures performed and the results of the testing. The notes shall be dated and indicate who performed the tests. The notes shall be retained as a permanent record in the laboratory and should note any abnormalities which occurred during the testing procedure. In the event that the person who performed the tests is not available as a witness at time of trial, the government may be able to introduce the notes in evidence under the Federal Business Records Act.

8. Standard methods of laboratory analyses shall be used as described in the "Guidelines Establishing Test Procedures for Analysis of Pollutants," 38 F.R. 28758, October 16, 1973. If laboratory personnel deviate from standard procedures, they should be prepared to justify their decision during cross-examination.

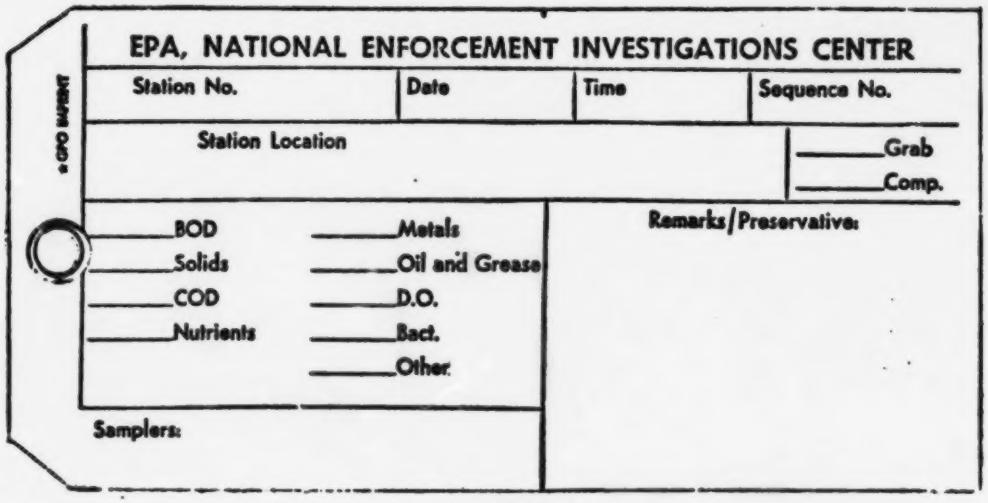
9. Laboratory personnel are responsible for the care and custody of the sample once it is handed over to them and should be prepared to testify that the sample was in their possession and view or secured in the laboratory at all times from the moment it was received from the custodian until the tests were run.

10. Once the sample testing is completed, the unused portion of the sample together with all identifying tags and laboratory records, should be returned to the custodian. The returned tagged sample will be retained in the sample room until it is required for trial. Strip charts and other documentation of work will also be turned over to the custodian.

Chain of Custody Procedures (Continued)

11. Samples, tags and laboratory records of tests may be destroyed only upon the order of the laboratory director, who will first confer with the Chief, Enforcement Specialist Office, to make certain that the information is no longer required or the samples have deteriorated.

EXHIBIT I



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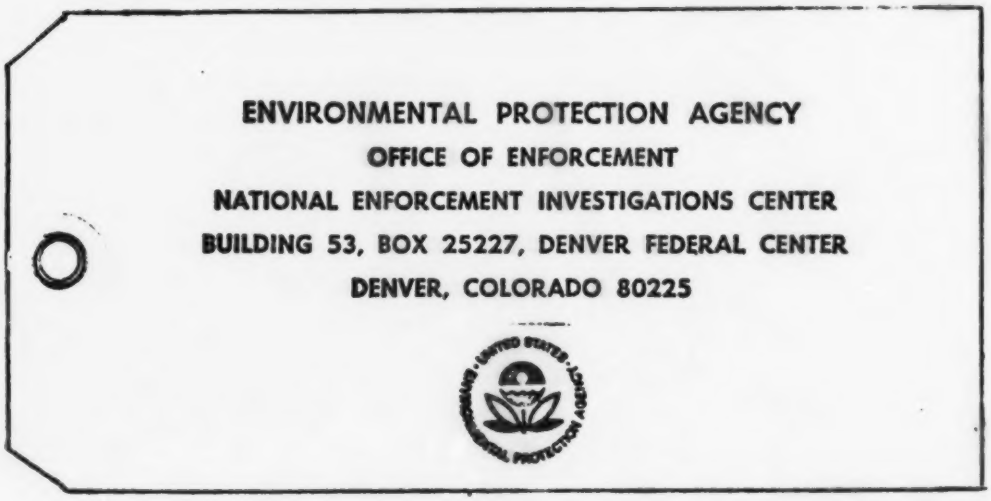

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

Back

EXHIBIT II

FOR _____ SURVEY, PHASE_____, DATE _____

TYPE OF SAMPLE_____

ANALYSES REQUIRED

STATION NUMBER	STATION DESCRIPTION	TOTAL VOLUME	TYPE CONTAINER	PRESERVATIVE	NUTRIENTS	BOD	COD	TOC	TOTAL SOLIDS	SUSPENDED SOLIDS	ALKALINITY	DO	pH*	CONDUCTIVITY*	TEMPERATURE*	TOTAL COLIFORM	FECAL COLIFORM	TURBIDITY	OIL AND GREASE	METALS	BACTI	PESTICIDES	HERB	TRACE ORGANICS	PHENOL	CYANIDE

REMARKS

19

EXHIBIT III

Samplers: _____

FIELD DATA RECORD

STATION	NUMBER	DATE	TIME	TEMPERATURE °C	CONDUCTIVITY µmhos/cm	pH S.U.	D.O. mg/l	Gage Ht. or Flow Ft. or CFS

ENVIRONMENTAL PROTECTION AGENCY
Office Of Enforcement
NATIONAL FIELD INVESTIGATIONS CENTER – DENVER
Building 53, Box 25227, Denver Federal Center
Denver, Colorado 80225

CHAIN OF CUSTODY RECORD

SURVEY

SAMPLERS: *(Signature)*

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE			SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED
				Water		Air			
				Comp.	Grab.				

Relinquished by: *(Signature)*	**Received by:** *(Signature)*	**Date/Time**
Relinquished by: *(Signature)*	**Received by:** *(Signature)*	**Date/Time**
Relinquished by: *(Signature)*	**Received by:** *(Signature)*	**Date/Time**
Relinquished by: *(Signature)*	**Received by Mobile Laboratory for field analysis:** *(Signature)*	**Date/Time**
Dispatched by: *(Signature)*	**Date/Time**	**Received for Laboratory by:**	**Date/Time**
Method of Shipment:		

Distribution: Orig. – Accompany Shipment
1 Copy – Survey Coordinator Field Files

GPO 884-809

APPENDIX D

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL FIELD INVESTIGATIONS CENTER – DENVER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TO : Chief, Field Operations Branch DATE: August 11, 1975

FROM : James L. Hatheway

SUBJECT: Tampering with Dye Injection Equipment, August 1, 1975

Mr. Dan Gilligan, Coordinator of Environmental Surveys, the Chester Engineers, Coraopolis, Pennsylvania, was requested by U.S. Steel to accompany the NEIC flow crew (Messers. Walz and Folmsbee) and evaluate our flow monitoring procedures. Mr. Gilligan collected duplicate samples and requested information on the tracer solution injection rates from Mr. Walz. Mr. Walz did not provide this information but referred him to the writer.

While the flow crew was checking the samples on the fluorometer, Mr. Gilligan indicated he was leaving. However, he returned to the dye injection point(s) to personnally check, without our permission or knowledge, the pump injection rate(s). To do this, it was necessary for him to remove the injection hose from the discharge line. As a result the flow calculated for the east discharge of the No. 1 and 2 blast furnace thickener increased from approximately 7 to 59 mgd because of the reduced dye concentration in the outfall line. Mr. Gilligans tampering invalidated this flow data point as well as the composite sample for the entire day [1/].

A flow increase of the calculated magnitude (i.e. from 7 to 59 mgd) would have been readily noted by the flow crew. The dye injection rate was checked and determined not to have changed since it was previously monitored at 2 a.m. August 1, 1975. U.S. Steel personnel were contacted on August 3, 1975 and questioned about Mr. Gilligans activities. They admitted that Mr. Gilligan had checked some of the dye injection rates. Subsequently the writer contacted representatives of U.S. Steel and Chester Engineers who agreed that this would not happen again.

On August 4, 1975, Mr. Gilligan phoned Mr. Walz at the Edgar Thomson Plant and denied tampering with or measuring dye injection rates. He seemed very upset that U.S. Steel personnel had informed us of his activities.

James L. Hatheway

1/ The composite sample was flow proportioned with a larger aliquot being used on the calculated 59 mgd flow.

APPENDIX E

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL FIELD INVESTIGATIONS CENTER – DENVER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TO : Chief, Field Operations Branch

DATE: August 8, 1975

Reproduced from best available copy.

FROM : J. Hatheway

SUBJECT: Oil Spill from the U. S. Steel, Edgar Thomson Plant, July 26, 1975

On Saturday afternoon, July 26, 1975, Messrs. Larry Walz and Craig Edlund were determining the time of travel from the thickener serving blast furnaces No. 1 and 2 to the Monongahela River (Discharge 002[1]) using Rhodamine WT dye. As the outfall is submerged, samples were collected from the discharge line next to the river and checked for the presence of dye.

The sample collected at approximately 1600 hours contained large globules of oil and grease. Mr. George Pitcairn, U. S. Steel, who was present at the time the sample was collected, immediately left to determine the source of this oil and grease.

Mr. Walz notified the writer of the subject spill and collected samples[2] of the discharge at 1745 hours for oil and grease analysis. The NEIC boat was launched and receiving water surface samples were collected upstream and downstream of the discharge. An oil film was visually observed on the Monongahela River for an estimated 3 miles downstream of the discharge with at least 25 percent of the water surface being covered by the oily film. The U. S. Coast Guard was notified by U. S. Steel personnel of the spill late the day the spill occurred.

Subsequent to the spill, U. S. Steel personnel stated that maintenance had been required on the No. 1 blast furnace and a tar line from the furnace was cleaned. The oily waste material was allowed to enter a drain instead of being discharged into 50 gallon drums as is the "normal" procedure. The spill was due to negligence on the part of a U. S. Steel Corporation employee.

Results show that the discharge contained 31 mg/l of oil and grease[3] to the Monongahela River. The oil concentration on the River surface was determined to be 2 mg/l upstream of the discharge increasing to 4800 mg/l downstream[5].

J. Hatheway

[1]002 contains the overflow from the thickener, cooling water from blast furnace No. 2 and cooling water from the No. 2 power station.
[2]Effluent samples were split with U. S. Steel personnel.
[3]Freon extractable material.
[4]Time was based on 1.5 hours, e.g., 1615 to 1745 hours.
[5]The downstream sample was collected approximately 300 yards downstream of the 002 outfall.

APPENDIX F

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL FIELD INVESTIGATIONS CENTER– DENVER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TO : T. P. Gallagher, Director
NEIC-Denver

DATE: July 8, 1975

FROM : E. J. Struzeski, Jr.
Industrial Waste Consultant

SUBJECT: Inspection Visit Made to Edgar Thomson Plant of the Edgar Thomson-Irvin Works, United States Steel Corporation - Pittsburgh Area, June 23 and 25, 1975.

Attendees on E. Thomson Plant Visit, June 23, 1975

USEPA:	J. Vincent	USSC:	Fred Thomas
	J. Hatheway		Bob Dunham
	E. Struzeski		George Pitcairn
	M. Miller		Basil Procyk
			Jeff Davis
			Bob Suzanski (photographer), Research, Monroeville

EPA, NEIC-Denver and Region III personnel made a detailed inspection of the E. Thomson Plant on Monday, June 23. A follow-up meeting was held with USSC on June 25 attempting to secure additional data on the joint facilities but we were largely unsuccessful at the latter session.

Background, Production

The E. Thomson Plant is a basic steel production facility for USSC manufacturing iron and steel for ingots which in turn, are rolled into slabs in a large-size hot rolling mill. These slabs, up to 44 inches in width, are conveyed by rail to the Irvin Plant of USSC. The Irvin Plant in turn, converts the slabs into various finished steel and tin products. The Braddock primary steel mill is approximately 100 years old, with first operations starting in 1875. Significant modernization has taken place at the ET Plant. A two-unit BOP shop has been recently installed, replacing an old 16-furnace open-hearth shop. Air pollution control equipment on the BOP shop is reported as relatively modern for the industry. In addition to the basic oxygen furnaces for producing steel ingots, Edgar Thomson has five blast furnaces, the 44-inch slab mill cited above, and an ingot mold foundry. Slabs are almost entirely shipped to the Irvin finishing plant. The steel ingots not sent to the 44-inch slab mill are shipped to other USSC mills or direct to consumers. ET produces 15 different ingot sizes. The ET mill is principally located in the Borough of North Braddock, a population center of about 10,000 people. Directly west is the Borough of Braddock with about 8,000 persons. The following description is taken from the public-noticed NPDES permit of July, 1974 for the E. Thomson Plant.

The maximum single month production over the last five years is given as:

8,800 TPD iron
6,900 TPD steel
6,700 TPD hot formed slab steel

Ingot mold foundry and sinter plant production figures were not available at the time of permit writing. Two intake stations supply the ET facility with up to 210 MGD water withdrawn from the Monongahela River. Some 0.1 MGD or less of spent waters are discharged to Turtle Creek through outfall 001, and the remainder of wastewaters is released back into the Monongahela through outfalls 002, 003, 004 and 010. The ET Plant is located on the right bank of the Monongahela River facing downstream approximately 11 miles upstream from the Monongahela River confluence with the Alleghany, the two serving to form the Ohio River in the Pittsburgh area.

Description of Outfalls

Preliminary description of each of the "permitted" outfalls is described below:

001 - NCCW from tar pumps, untreated, enters No. Versailles storm sewer which in turn, runs into Turtle Creek.
002 - Includes "treated" process wastes from ingot mold foundry; untreated NCCW from boiler house, power station and blast furnaces; and treated process wastes from blast furnaces 1 and 2.
003 - Settling basin treatment provided to a combination of process water from slab mill scale pit, NCCW from blast furnaces, boiler house discharge, and Braddock Avenue storm sewer flows. Additionally, backwashes from a sand filter providing water supply to the BOP facility enter the 003 sewer line.
004 - Receives untreated NCCW from blast furnaces, treated process wastes from blast furnaces and sinter plant, and 13th Street storm sewer flows.
010 - Receives BOP effluents consisting of untreated NCCW and treated process wastes.

A rough layout of the Edgar Thomson primary steel production plant is shown in the enclosed schematic. To date, detailed plant overlays have not been received from USSC, even though previously requested by the USEPA. We were at a considerable disadvantage without the plant layout.

Current Status

Employment at the ET plant is currently around 2,500 persons. Peak employment is about 3,200 and they normally drop to around 2,000 persons through the fall months. The Irvin plant will peak around 4,000 workers but as of the end of June, they were down to 2,000

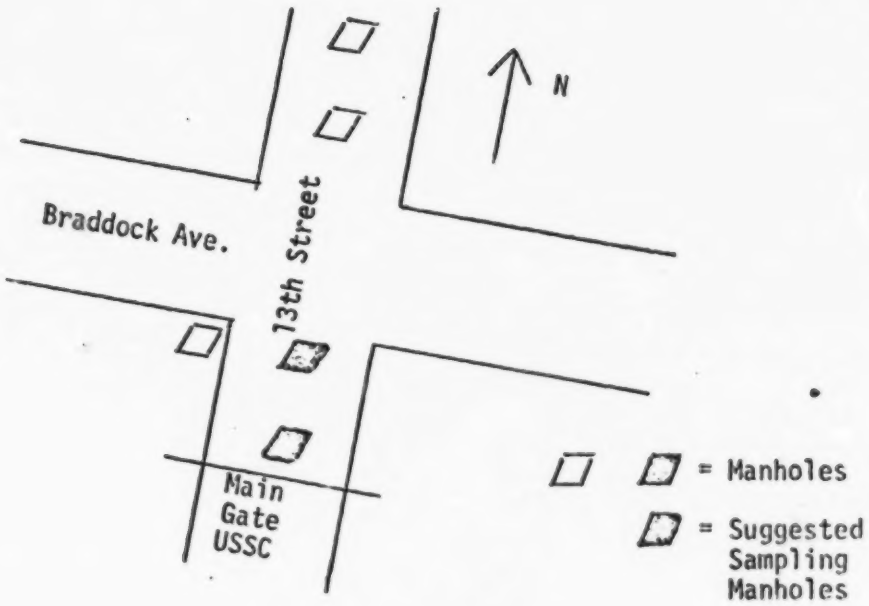
and going lower. The E. Thomson plant is roughly 100 years old in contrast to the much newer Irvin plant. We were told the ET plant was operating about 70%-75% of capacity. Based upon blast furnace operations, of the 5 units available, only three were running on June 23, i.e. Nos. 1, 3 and 5. This gives roughly a 60% capacity fc June, 1975. The old No. 7 blast furnace had been demolished some time ago. Although a blast furnace can be banked and temporarily taken out of operation, about one week is normally required for complete and safe shutdown of a blast furnace.

Steel Making - Basic Oxygen Furnaces, Water Intakes, Peripheral Operations, and 004 and 010 Outfalls

We started our plant tour in the area of the BOP Shop, the Oxygen Plant, and outfalls 004 and 010. The central plant water intake and a water treatment plant are also located in this sector of the ET mill property. The central pump intake has 3 steam-powered and 3 electric-powered pumps which reportedly have a maximum withdrawal capacity of 90 MGD or greater. Discrepancies were inherent in the water intake figures given by various Steel personnel. Plant personnel collect their NET samples for the NPDES permit (on the intake) from the second wet well from the east side on the pump intake structure. Two apparent discharges from the Central Pump Intake station were noted by EPA personnel on June 21 (from the River cruise) and again on June 23. The first of these was an excess water return back to the Monongahela River and the second was described as trash screen wash water from the water intake station also being returned back to the River. We note NET waste loads even if applicable at Edgr.Thomson should be determined following water treatment-not before.

In addition to central pump water intake, the ET plant maintains a second intake works which is gravity flow situated at the east end of U. S. Government Lock No. 2. This second intake has a reported maximum capacity of 90 to 100 MGD. This intake is intended to principally serve Power Plant #1 and sometimes Power Plant #2. In the support materials to the NPDES permit, USSC has stated that outfalls 001, 002, 003, 004 and 010 have a maximum combined discharge of about 208 MGD which very much seems on the high side. These support materials furthermore, do not recognize the existence of a No. 1 Power Station.

Central plant intake water is subjected to "some" chemical addition and settling. Water treatment plant sludges are said by Steel to be diverted to an ALCOSAN (Allegheny County Sanitary Authority) combined sewer on USSC property. (Note: this information is in contrast to data contained in the previous NPDES application) This particular sewer is believed to intercept the 13th Street storm sewer which will serve to complicate the EPA field sampling survey. The 13th Street storm sewer, if not intercepted, finds it ways down into the 004 outfall of USSC. The 13th Street storm sewer would need to be sampled close to the main gate near Braddock Avenue to establish NET loads for the 004 outfall, if necessary (see diagram on following page.) Again, the ALCOSAN sewer could serve to complicate a circuit load balance.



Central plant water intake supplies a myramid of uses at the E. Thomson plant including makeup to a double set of cooling towers serving the BOP shop. The ET BOP shop has two basic oxygen steel-making units each rated around 225 tons per heat. One BOP unit is presumed in continuous use whereas the other serves as standby. Unspecified biocides are employed in both cooling water/recycle towers. All NCCW from the BOP shop goes through these two cooling towers. Blowdown from both cooling towers are discharged to outfall 010.

The BOP shop at Edgar Thomson is basically equipped with a wet air pollution control system. The USSC, BOF system is essentially a 2-stage water scrubbing-cooling system with a quench water settling tank and a conventional thickener. The air pollution treatment works for the ET BOP shop does not appear to incorporate any dry gas cleaning sub-systems. One cooling tower for the BOP shop is principally utilized for "NCCW" resulting from gas cooling, i.e. likely the direct-contact cooling tower, the venturi and the quench assembly. The second double cell cooling tower is available for cooling water from the oxygen lance(s). Overflow from the small quench water settling tank is bled off to the ensuing 150 ft. $\pm$ diameter thickener. Sludge underflows from the quench water settling tank are thought to be directed to the vacuum filter station. Continuous overflow from the large 150 ft. diameter thickener is directed to the 010 sewer with the

sludge underflows pumped to the vacuum filter station. No polymers are normally used in the thickener. There is reported no possible access for sampling the thickener overflows prior to their release to the 010 sewer. Sludges off the bottom of the thickener are reported as having around 25-35% solids content and after filtration, the sludges are brought up to about 60% solids content. This station has two vacuum drum filters. Filtrates are returned to the thickener. Filter sludges which may ordinarily go to the ET sintering plant are currently being trucked to a "dump."

Other waste flows from the BOP sector finding their way into the 010 sewer include: 1) some bottom pit water draining the ingot mold pour area inside the BOP building; and 2) washdowns from the thickener sludge truck washing station and/or vacuum filter station.

The BOP shop, besides the complex air pollution control systems described above, is also equipped with a small baghouse for the railroad car materials receiving station and a small baghouse covering transfer conveyors at the BOP building. There are basically no controls for the open area in the BOP house, i.e. figitive dust, et. al. We noted large black puffs of smoke off the BOP shop in spite of these incorporated air pollution controls.

Fred Thomas mentioned (some) previous attempts by USSC to divert storm flows in the 13th Street sewer into the 11th Street storm sewer. They seemed to be concerned that the 13th Street sewer storm flows could find their way down the 010 outfall. This appears highly unlikely. We asked USSC as to the possibilities of Steel area drainage to the 11th Street sewer. The consensus of opinion was that area drainage from the ET site could reach the 11th Street collection system. On June 23, we noted little or no net flow from the 11th Street sewer into the Monongahela River.

The oxygen plant was found to have spent cooling water discharge into outfall 004. Furthermore, an unknown discharge was observed from the River wall in the direct vicinity of the oxygen plant. Data is being sought from USSC on the latter water stream. Previous NPDES permit support materials indicated no discharges from the USSC, ET oxygen production plant. Outfalls 010 and 004 enter the River almost together. USSC samples both outfalls from the bluff overlooking the River. Outfall 010 is sampled at a manhole at the dirt road close to the oxygen plant a very short distance upstream of the mouth of the sewer. Outfall 004 is sampled just north but within the confines of the oxygen production plant and power distribution station, also from a manhole. NCCW from the oxygen plant enters this same manhole. The 004 sewer receives wastewater from many diverse sources listed in this report. The Company's 004 sampling point may not be downstream of the influence of all contributory flows into this sewer. Flow determination at the 004 and 010

manholes is impossible. Sampling and flow determinations are advised for both outfalls 010 and 004 at their final points of discharge into the River. Flow determination in any event, will be exceedingly difficult. Sewer 010 at the River was observed to be surcharging due to a blocked screen inside the end of the pipeline. Steel reluctantly may clean the sewer out if we demand. The 004 outfall is scarcely in better shape. It may be best for the EPA to survey outfalls 010 and 004 from the River by boat rather than from land. Both outfalls 010 and 004 have large flows, respectively reported by USSC as 10.0 MGD and 14.0 MGD. On June 23, flows were observed larger in outfall 010 than outfall 004.

Sinter Plant and 204 Thickener

The ET Sinter plant has been shut down since January 1975 because of fugitive dust and other air problems. USSC has decided at least for the present, to keep the Sinter plant closed. The blast furnace flue dusts when recovered, are being blended and added to incoming iron ores at ET, On the other hand, iron oxide from the BOP shop and other areas is currently being dumped rather than reused. The 204 thickener, a double-decked unit approximately 50 ft. in diameter, is located in the area of the Sinter plant and is operative. The 204 thickener receives underflows from the two blast furnace thickeners, i.e. the No. 7 thickener serving BF Units No. 3, 5 and 6, and the so-called No. 1 and 2 thickener serving blast furnaces No. 1 and 2. The 204 thickener overflows via sampling station 204 into sewer 004. The effluent from the 204 thickener is sampled at a drop box at ground level alongside the thickener unit. Sludges from the bottom of the bottom of the 204 unit are sent to a drum filter, and then routed to the iron ore stock piles. A circular unit was observed on the north side of the Sinter plant, non-operative. We were told this unit was a rotary drum cooler used in handling the sinter product. The 004 sewer besides receiving 204 thickener overflow, also accepts "NCCW" from the No. 6 blast furnace, overflows from the No. 7 thickener, and storm flow via the 13th Street storm sewer.

Blast Furnace Operations

The next area visited was the No. 5 and 6 blast furnace operations. The overflow from the No. 7 thickener entering into a side collection box is known as sampling station 104. The No. 7 thickener is screen-covered on top and has an estimated diameter of 125 feet. The effluent had a very distinct aroma, i.e. "sweet smelling." (This same scent was later noted at the 102 and 002 (002W) sampling points) Flow determination at the 104 point will be almost impossible. Both the 104 and 204 thickener overflows were observed as very warm.

USSC was reluctant to provide us with any useful information on the air pollution control equipment on the various blast furnaces. Available equipment on each of the blast furnaces apparently consists of a dry-type settling chamber followed by wet gas scrubbing/cooling with a venturi. No third stage was apparent. All blast furnace gases once

cleaned at ET are completely reused in the boiler house, stoves and other processes. Wet effluents from the venturi and gas scrubbing are sent to conventional iron-steel industry thickeners.

At the Nos. 1 and 2 blast furnaces, gas cleaning effluents in the slurry form enter into thickener No. 1 & 2. This thickener is approximately 120 feet in diameter. During our visit, we found USSC has been sampling the 102 point at an intermediate point in the settling system rather than the thickener plant effluent. The Company indicates they will immediately shift the effluent sampling point to a final overflow box off the thickener. All previous sampling data for the 102 point may be supposed to be "too high." We noted that a total of six stoves serve blast furnaces Nos. 1 and 2. Large amounts of NCCW are associated with the blast furnaces. The cooling water stream from blast furnace No. 2 was seen to join with the thickener No. 1 and 2 overflows before entering sewer 002E. Cooling water from BF No. 1 is routed to sewer 002E, and that from B.F. No. 3 to sewer 003.

Blast furnace slags produced at ET are shipped via special railroad cars to the Duquesne USSC mill for reclaiming. The slag loading area is just west of the ingot mold foundry complex. BOP slag was reported to be partially reclaimed on-site with the remainder stored at ET and/or off-site. Slag is discarded direct without conversion to granular slag.

Outfall 003 and Contributory Systems

In summary review of waste sources feeding the 003 sewer, we cite the following:

1) Hot cooling water flows from blast furnaces Nos. 3 and 5.
2) Spent cooling waters (up to 20MGD) from the turboblower station.
3) Scale pit effluent from the 44-inch slab mill (up to 19.5 MGD.)
4) Storm flows from the Braddock Avenue storm sewer (the EPA field crew during June 23-25 was not able to locate an upstream manhole on this storm sewer in the event NET load calculations are necessary; selection of such manhole near Braddock Avenue must be made prior to the July 75 field survey. Thomas indicated this storm sewer appears to run just north of the ET slag pile and immediately west of the mill gate in this sector.

5) Additionally, a second water treatment plant located adjacent to the No. 2 power plant releases blowdown, treatment chemical and ziolite backwashes and filter plant sludges, all into the 003 sewer.

At the very end of the 003 sewer is a large concrete settling basin built directly into the River wall. This basin constructed in 1942 is 197 feet in length with V-sides in cross-section. The 003 flow enters the basin on the northeast corner and exits over a weir

through the southwest corner of the large concrete chamber. Some solids are removed in transit of the 40 MGD + flow down through the tank, but the basin serves principally to remove floating oils and scums. An under-sized floating skimmer ("Eaton" drum type) and an oil boom, were observed at the far end of the basin. The skimmer was not operating during our visit. Large quantities of floating oils were present in the basin together with oily settleable solids accumulations on the side walls in certain sectors of the basin. The basin was in bad need of a general cleaning. Most oils/scum are thought to find their way to the River. The skimmer is believed functional a very small percent of the time. Contents of the 003 basin are released via a submerged pipe a short distance out into the River.

Some information was obtained on fuel sources. Coke oven gas from Clairton is known to be used in many USSC operations including those at the ET mill. The power plants principally operate on blast furnace gas plus coal. The Turboblower House utilizes coal as a supplementary fuel source.

Outfall 002 and Contributory Systems

The 002 waste sewer at the Edgar Thomson Works may be divided into a 002 west and and 002 east subsystems. The two join together just short of the River wall. Waste sources on each are summarized as follows:

002 W
Overflows from thickener No. 1 and 2.
Spent cooling water flows from blast furnace No. 2.
No. 2 power station hot flows (up to 118.7 MGD reported).

002 E
Scale pit effluent from ingot mold foundry.
Stirling Boiler House effluents.
Spent cooling water flows from blast furnace No. 1.
No. 1 power station hot flows (not shown on any previous materials submitted by Steel to the EPA).

The Company is presently collecting 002 samples on the 002W line as shown in the enclosed sketch of the Edgar Thomson mill. Thus, pollution loads from the ingot mold foundry are being excluded from Company results. Samples for 002 are taken from an extremely small "hole" a few inches across and perhaps about 10 feet down into a very fast-moving sewer.

A similar access to the end of the 002E sewer was found via a small hole into the line. The access points for 002W and 002E are a short distance apart. Flow determinations are impossible. Although the Company does not sample 002E (nor 002), the NPDES permit does specify sampling at 202 which is the effluent of the scale pit from the ingot mold foundry.

During our inspection of June 23, the 202 ingot mold scale pit was clogged and the water level was considerably above the normal outlet. Size of the two compartment basin was approximately 45 feet and 18 feet. We were told some of the scale pit wastewater is recycled back through the ingot mold foundry. The basin has no skimming facilities. Appearance of this scale pit was very dirty. The effluent was reported to be primarily from wet scrubbing of dust from air streams inside the foundry. We were not able to obtain any useful information on air pollution control equipment serving the foundry.

Slab Mill

We next visited the area of the 44-inch slab mill. This mill operating on coke oven gas and natural gas was emitting black smoke intermittently. Fred Thomas indicated the mix of natural and coke oven gases was probably unbalanced. Air pollution control at the slab mill is minimal, but an unspecified number of rotoclones, i.e. wet scrubbers for the air in the mill are available. This scrub effluent discharges to the 003 sewer by passing the slab mill scale pit. In passing through one part of the mill, it was quite evident to us that fugitive dust levels, especially inside the building, were quite high. The mill was not "rolling" during our pass-through. The ET plant turns out a slab size of approximately 37 inches wide X 12 inches thick X 190 inches long. The scale pit located "inside" the mill was less than impressive considering the amount of scale being accumulated throughout the working areas. We estimate the size of the pit to be roughly 14 feet wide X 50 feet long X 25 feet deep. The scale pit effluent finds it way to the 003 sewer. USSC personnel could not provide size or detention time of the scale pit. They were also extremely reluctant to show us the slab mill and the scale pit. Viewing of the scale pit was difficult at best.

Outfall 001

We viewed Turtle Creek between the ingot mold foundry and the slab mill, and again at the 001 discharge site. Turtle Creek is in extremely poor shape from upstream waste sources carrying extreme amounts of floating end emulsified oils and floating and suspended solids. USSC professes to have no discharge via outfall 001 although observations at the far end of the sewer show otherwise. The NPDES permit ascribes a maximum of 0.1 MGD for 001 due to NCCW from USSC tar pumps. Appreciable oil sheen was present directly adjacent to the outfall and a USSC oil boom was moored around the outfall; the boom was ineffective due to lack of maintenance and holes in the assemblage. Thomas indicated ET had previously used some absorbent "throw-away" pellets in hopes of minimizing oil problems at 001. ET personnel thought perhaps the storm sewer contributing to 001 and passing through the now-abandoned open hearth area, could perhaps be releasing tars and oils from residual materials left in the sewer, "but this was no problem of theirs." The Company has been given permission from the EPA not to sample outfall 001 and hence, no sampling results are available from USSC. This point will also be a difficult one to sample and gage.

T. P. Gallagher, Director July 8, 1975

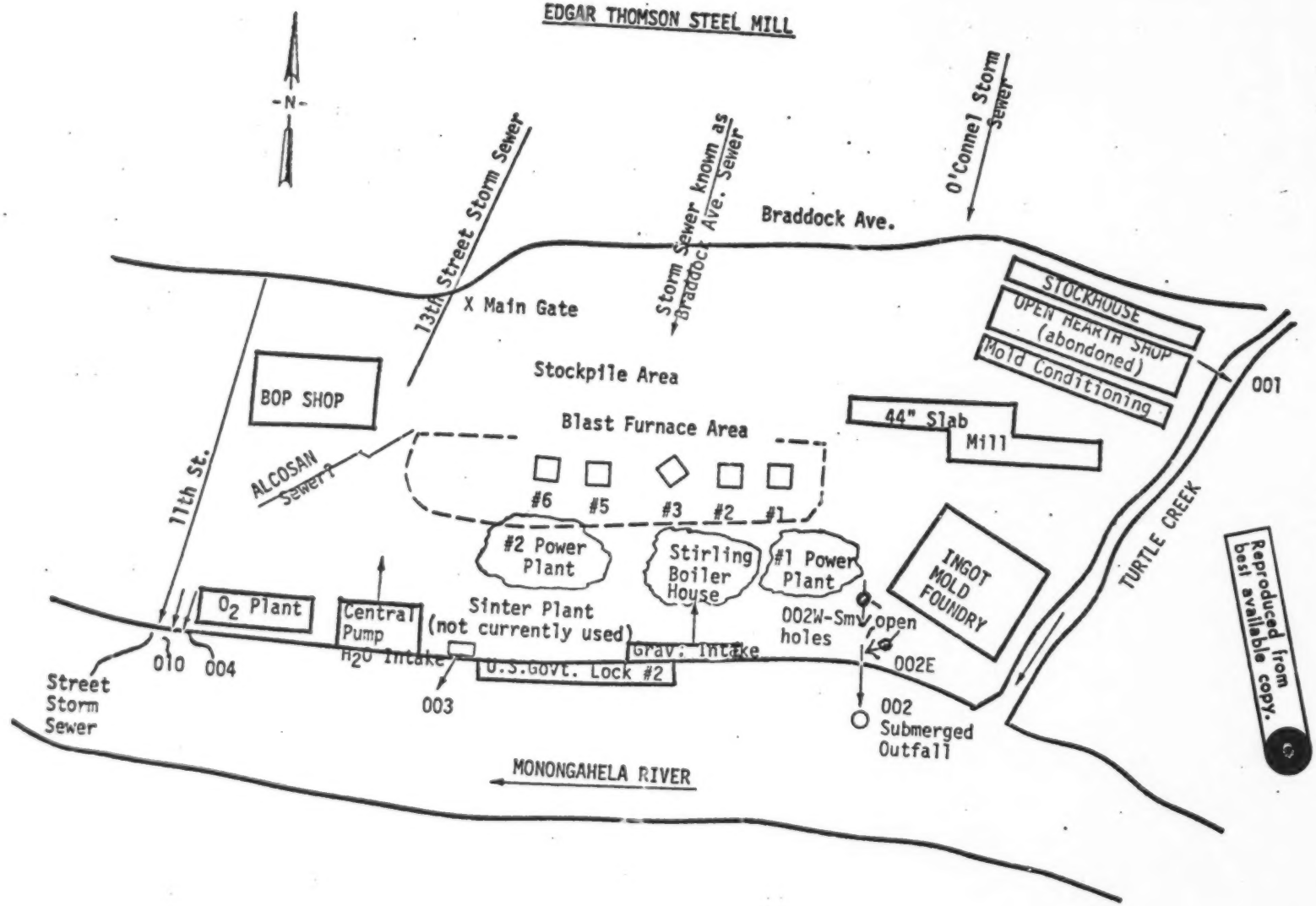
In order to better appreciate problems on the 001 sewer line, the tar storage and handling sector was visited. This area is situated directly north of the old open hearth building. We were previously told yard sewers in the area had been cemented to preclude surface drainage from the yards into the 001 sewer, but this was not found to be true. The NCCW in question arises from an air compressor utilized for general plant use, previously employed for open hearth operations. The term "tar" is appropriate for this plant area since there is considerable tar over the grounds generously embedded into about every available surface. This tar is obtained from the Clairton Works by railroad and used as fuel supplement at the ET plant. Four storage tanks were seen at ET. The tar is fluidized by steam and mostly used in the ET blast furnaces.

Since a public storm sewer is thought to contribute to outfall 001 at its top end, a search was made for a control manhole upstream. Previous materials from Steel and that contained in the NPDES permit show this line to be a storm sewer belonging to the Borough of North Versailles. However, according to E. McKeesport public officials, this is not true. A manhole was selected in the middle of the intersection of Braddock Avenue and O'Connell Street for possible sampling control on this sewer. This location is directly north of the old open hearth area. This manhole actually belongs to North Braddock and not to North Versailles or East McKeesport.

Other Contacts Made

Borough of North Braddock - Mr. Patriska, Borough Engineer
Township of East McKeesport - Mr. Jesse Reed, Chief, Public Works

cc: Blackman
Benson
Hatheway
Pennington
Vincent
Wills



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